STADIUM FEASIBILITY ANALYSIS

A STUDY OF ALTERNATIVES FOR A STADIUM FOR THE CITY OF SAN FRANCISCO, CA.

City Planning

VOLUME I

RESEARCH AND DATA

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VOLUME I – COMPLETE REPORT

INTRODUCTION

PURPOSE:

The purpose of this report is to present the data gathered by the Stadium Feasibility Task Force established by Mayor Dianne Feinstein. The report is intended to aid the Mayor, The Board of Supervisors and the Citizens in deciding the future of a major stadium/multi-events facility in San Francisco.

The authors of this report were charged with the task of gathering sufficient information necessary to facilitate the decision of whether to renovate Candlestick Park or to construct a new downtown stadium. The report is not intended to make recommendations, state preferences or profer opinions.

Working within the limits of the budget for this work and a limited time schedule (3 months), the authors have gathered salient data concerning the real estate, urban design, architectural, engineering, construction costing, traffic, transportation, parking, economic, financing, legal and public opinion issues and impacts surrounding this issue.

It is the belief of the Stadium Task Force and its consultant study team that this material is adequate in scope to properly assist the decision makers of San Francisco in determining the future of a stadium in this city.

HISTORY OF ATHLETIC FACILITIES IN SAN FRANCISCO

THE NEED

As is the case in most decision making processes, it is helpful to understand the historic events that have led up to and created a "need." The current athletic facility at Candlestick Park as well as other existing "event centers" (i.e. The Cow Palace) have long been considered inadequate by patrons and operators alike. Negative factors of size, access, parking, adequate public facilities and food service areas, as well as severe weather conditions have posed problems to the proper and comfortable staging of public events.

San Francisco has a long history of picturesque, unusual and sometimes inadequate municipal athletic facilities. In addition to many public recreation centers (which will not be discussed here), the City has had many public spectator facilities.

THE EARLY YEARS

San Francisco has a long-held tradition of enthusiasm and interest in spectator sports that extends as far back as the 1860s when the first baseball game was played on a sand lot at 16th and Harrison Streets in the Mission. The city's first enclosed ballpark was built at 25th and Folsom Streets. Opening day at the park in November 1868 saw the San Francisco Eagles defeat the Oakland Wide Awakes, 37 to 23. In 1885 Central Park at Eighth and Market Streets opened. The park, with its grandstand as the backstop, was a long narrow field running from Market to Mission along Eighth.

Beginning with the 1888 baseball season San Francisco had another new park, the Haight Street Grounds at Stanyan across from Golden Gate Park. On opening day a crowd of 7,000 watched the game between two San Francisco teams, the Pioneers and the Haverlys. Just four years later on March 19, 1892, nearly 20,000 people gathered at the Haight Street Grounds to witness the first Big Game between Stanford and the University of California. Throughout the 1890's the Stanford football team played all its home games either at the Haight Street Grounds or Central Park. In the early 1900's, the Big Game was played at Richmond Field, 6th Avenue and Lake Street, but by 1904 San Francisco no longer hosted the Big Game. Beginning in that year, the game was played alternately on the two university campuses.

The first site of Recreation Park, perhaps San Francisco's best-loved baseball park, was at Eighth and Harrison Streets where in 1897 San Franciscans could see a baseball game for 25¢ and sit in the reserved section for another 10¢. The second site of Recreation Park, with an expanded seating capacity of 16,500, was at 15th and Valencia. From 1907 to 1930, with one brief interruption, it was the home of the San Francisco Seals of the professional Pacific Coast League and the Missions, another league team who had a short stay in the city.

Built from warped lumber and hazardous chicken wire and often referred to as a "crackerbox" by baseball writers, it nevertheless had all the intimacy, informality, warmth, and color of the traditional baseball park described in that old favorite, "Take Me Out to the Ball Game." Fans loved the place <u>and</u> the Seals; in 1926, the Seals finished last in league standings and first in crowd attendance. Recreation Park had a full complement of colorful features: the "Booze Cage," a dark, dank wire-enclosed spot under the Grandstand where the real baseball nuts gathered; "Pop" Hardy, a bowlegged, rotund groundskeeper and his lawn-mowing goat; Otto Makowski, the one-armed announcer with a flair for dramatic presentations, and a private dining room in which to entertain scouts from the major league teams.

The shortcomings of the park, even by 1913 determined inadequate for a top minor league team, led Seals president J. Cal Ewing to build a new stadium, Ewing Field, on Masonic Avenue just below the sand hill called Lone Mountain. Unfortunately the research of the site had been inadequate. When the Seals began their 1914 season there, everyone realized that the field was directly in the path of the rolling fog that not only chilled players and fans alike, but frequently obscured both flyballs and outfielders for tense moments. Midseason, the Seals moved back to Recreation Park in the sunny Inner Mission where they remained until 1930 when Seals Stadium at 16th and Bryant was completed.

Built at the height of the Depression by the optimistic trio of Charley Graham, George Putnam, and Charles (Doc) Strub, Seals Stadium featured a lighting system that rivaled the best in the majors, a rare turf, and a lawn expert from Scotland to install it. Called a "fairyland of diamond entertainment," it had the world's first glass backstop, the land's first female ushers, a soda fountain, barber shop, and draft beer. Pacific Coast League teams played there until 1958 when major league baseball came to San Francisco. It then became a temporary dwelling for the Giants until their new stadium was completed at Candlestick Point. Seals Stadium was razed in 1960 and replaced with a White Front department store and large supermarket.

San Francisco's proximity to Stanford and Cal, universities with fully equipped stadia, dampened the demand for a full-sized football stadium in San Francisco until 1921. Then demand arose not from professional football's needs, but from amateur competitors, local colleges, high schools, and clubs. That year Polytechnic High School presented their own study and plans for a needed sports facility to Mayor James Rolph. Shortly after, Mary A. Kezar donated $100,000 to Golden Gate Park in memory of her mother, Nancy Kezar. Stadium construction with facilities for football and track began on a site adjoining park land formerly used for the nursery, stables, wagon sheds, and mechanics' shops.

In December 1924 the first unit of Kezar, seating 23,000, offered football and track facilities for amateur competitors such as Finnish track and field star Paavo Nurmi who competed there in 1925. In 1928 the second unit was completed, enlarging the stadium to seat 62,000. Kezar was primarily the scene of collegiate competition in football and track. St. Mary's, USF, St. Ignatius, and Sacred Heart were among the schools using the facilities.

In 1946 the Forty-Niners football team under Tony Morabito sparked San Francisco's interest in professional football and revitalized enthusiasm for Kezar. Kezar became the home of the new team. Designed with formal dignity and huge exterior wall expanses and high entrance openings, the facility presented a sharp contrast to the Forty-Niner fans who became best-known for their beer-drinking, bottle-throwing, and raucous ways. Ironically, Mary Kezar's hope that Kezar would be a place where boys became men was neatly reversed. In 1956 a dome cover for Kezar was proposed by some. Labelled a "classically horrid" idea, the notion was quickly abandoned. The Forty-Niners remained at Kezar until 1970 when they joined the Giants at a newly expanded Candlestick Park. When the Forty-Niners left, Kezar once again became primarily the site for high school athletic events and occasional rallies.

Candlestick Park was the culmination, in the 1950's, of a drive to bring major league baseball to San Francisco. Under the ownership of Horace Stoneham, the New York Giants were brought to San Francisco and given a new home at Candlestick Park in 1960. The name was given to the stadium through a public relation contest - won by a local sports fan. The initial facility was designed for baseball and contained 32,000 seats.

In the late 1960's, studies were initiated to expand the facility to provide for professional football. By 1970 construction was completed on the expansion to bring the stadium to its current seating capacity of 61,450. In its 20 year history Candlestick Park has served as the only major outdoor professional sporting facility on the San Francisco penninsula.

Problems have plagued the park from its inception. Erratic winds and fog have always posed major problems. Inadequate food service facilities, inadequate toilet facilities, poor automobile and transportation access, lack of adequate parking, intrusion on surrounding residential neighborhoods and poor pedestrian circulation are but a few of the major defects that exist today. Repairs for vandalized areas, nominal wear and tear and general deterioration of the structure have not been provided in recent years (due to lack of City funds). Recent, minor repairs have been funded by the City to re-anchor loose seating, upgrade toilet rooms, provide a better sound system and regrade the parking lots. However, the major problems still exist.

In addition, the City has not been able to upgrade those facilities that would enable Candlestick to "compete" in today's sophisticated sports and multi-purpose market. Lack of adequate television broadcasting provisions, adequate press boxes, proper score boards, and competitive luxury boxes are examples.

The City is faced with the problem of an inadequate and deteriorating facility. It is this problem which has prompted exploration of alternative solutions to the provision of a facility that is sound structurally and adequate functionally. As was stated earlier, this decision has been narrowed to the choice of renovating Candlestick Park or building a new stadium.

HISTORY OF THIS STUDY

For several years, the Giants organization has been concerned with the problems at Candlestick. Serious consideration has been given to moving their major league franchise to another city if significant remedial action is not taken. To facilitate action, the Giants commissioned a study of their own in 1981. A team headed by the architectural firm of Crosby, Thornton, Marshall Associates was retained to study the feasibility of renovating and doming Candlestick Park. They also sought the help of the construction management firm of Barton/Malow of Detroit to verify the constructability and cost of retrofitting Candlestick with a dome. HNTB of Kansas City and Geiger-Berger of New York were asked to develop plans and costs for a new, downtown stadium. The firm of Laventhol and Horwath was retained to explore the economic and financial impacts of these alternatives.

In March of 1982, the Giants presented their findings to Mayor Feinstein in a report entitled, "The Future of Candlestick Park." The Mayor took immediate action and established a blue ribbon advisory Task Force to analyze and recommend action on the Giants' report. This Task Force is made up of representatives of key departments in the City as well as representatives of the leasee's of the Stadium (Giants, 49ers, etc.) and representatives of the private sector (S.P.U.R., etc.).

The Blue Ribbon Task Force recommended the establishment of a working task force made up of the Department heads of the Planning Department, Department of Real Estate, Department of Public Works, Department of Parks and Recreation and the City's Legal Department. The working Task Force instigated a site search in the downtown area and prepared a work program for the collection of data to be submitted back to the Mayor and Board of Supervisors. The initial phase of the work program called for a three month study to determine the feasibility of renovating Candlestick or building a new stadium.

The second phase of the Work Program is envisioned to cover all of the issues in significantly more depth and would focus on the chosen alternative. Included in this phase would be further refinement of economic, financial, and traffic/transportation impacts. It will also include an environmental impact analysis

or statement.

The Final Phase of the Work Program is to include the final acquisition of land, arrangement of finance, selection of a consulting design team, etc. . . .

The following is therefore submitted as the fulfillment of Phase I of the Task Force's Work Program.

FOOTNOTES:

Historic data prepared by Rosalind Crosby, M.A.

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A. CANDLESTICK PARK

INTRODUCTION

The options open to the City of San Francisco appear to be far broader for the Candlestick site than was initially envisioned by the study team. Several logical alternatives have been suggested by members of the city staff, Board of Supervisors, and the public at large. The team has grouped these suggestions into the eight alternatives that are presented here.

These alternatives divide into two general categories - development of the site for alternatives without a stadium and development with a stadium. Should the City elect to build a new downtown stadium, the Candlestick site would be developed for other uses. The team attempted to identify those uses and to present all of the major impacts associated with this form of development. The other half of the Candlestick study deals with the prospect of leaving Candlestick stadium and renovating it or providing a new stadium at the Candlestick site. In either case it was assumed that the resultant facility would include those amenities that have come to be associated with today's multi-use stadium.

The restraints of working with the existing structure at Candlestick are numerable, but not all are insurmountable. Significant enough improvements can be made to provide for a facility comparable in quality to most modern stadiums. Some of the insurmountable restraints are:

1. Limited seating - Candlestick has 61,500 seats - the Super Bowl would never be held here due to the NFL's minimum requirement of 70,000 seats.

2. Pedestrian Circulation - can be partially improved by cannot be (economically) updated to handle maximum crowd movement.

3. Adequate size luxury boxes cannot reasonably and economically be provided. The study shows that 109 new boxes can be built at great cost.

4. One final note - the studies showing improved freeway and surface street access to the site demonstrate the possibility of providing solutions to the long standing problem of proper vehicular traffic movement. The long suffering residents of this area as well as the patrons of the Park are living testimony of this need.

The City of San Francisco should consider no further improvements or expansions to the Candlestick site without providing these, or similar, improvements to the surface streets, access arteries, interchanges and freeway systems.

1. REAL ESTATE

A. SCOPE

The scope of services for this element of the study is summarized as follows:

(1) Determine preliminary estimates of the cost of demolishing the stadium and removing all non-salvagable debris from the site.

(2) Determine a preliminary appraisal of the 77.5 acres currently occupied by the stadium and adjoining parking lots considering three alternative uses of the site.

a. Housing Intensive to explore the housing development potential of the site.

b. Industrial Intensive to explore the potential for creating an area to house blue-collar jobs.

c. Office park to explore the maximum potential value of the property.

B. DATA

The data that was used to research each of the above tasks is as follows:

(1) Industrial land real estate comparables for transactions in the south Bay area.

(2) Preliminary estimates from demolition contractors on Candlestick's demolition.

C. ALTERNATIVES

Two alternatives were considered for the demolition of Candlestick Park Stadium:

a. Demolition of the stadium down to the foundations and removal of all non-salvagable debris from the site.

b. Demolition of the stadium and removal of existing foundation work, and removal of all non-salvagable debris from the site.

Eight separate development programs were posed for the use of Candlestick Park's 77.5 acres. Four alternatives assumed no stadium and a complete reuse of the entire area. The other four alternatives assumed a stadium at Candlestick Park. Two of these alternatives assumed development on the parking lots.

The development program for each alternative is as follows:

DEVELOPMENT PROGRAM FOR ALTERNATIVES

ALTERNATIVE	STADIUM	HOUSING (Units)	OFFICE (Gsf)	COMMERCIAL (Gsf)	HOTEL (Rooms)	INDUSTRIAL (Gsf)
1	None	320	1,257,800	-0-	-0-	-0-
2	none	-0-	800,400	-0-	-0-	450,000
3	none	3,030	473,700	-0-	-0-	-0-
4	none	220	392,000	-0-	-0-	584,800
5	upgrade	500	1,000,000	50,000	400	-0-
6	new	-0-	-0-	-0-	-0-	-0-
7	new	500	1,000,000	50,000	400	-0-
8	upgrade	-0-	-0-	-0-	-0-	-0-

Of these eight alternative development programs, land values were considered for alternatives 1 through 5.

D. ANALYSIS:

DEMOLITION COSTS

In a preliminary review of the existing plans for Candlestick Park Stadium HNTB/CTMA/Geiger Berger determined that the amount of concrete which would have to be demolished and removed totalled approximately 71,000 cubic yards. Because much of the existing structure is stressed concrete, demolition costs could be high because the structure may have to be dismantled rather than blasted.

Preliminary estimates from 3 demolition contractors located in the Bay Area indicated that the cost of demolishing Candlestick Stadium down to the foundation and removing all debris would range between $750,000 and $1,000,000.

In an analysis of construction costs for a new stadium at Candlestick, the cost consultants determined that it would probably be necessary to remove a portion of the existing stadium foundation in order to construct new development over the area. If all foundation work had to be removed the total demolition cost could be as much as $2.5 million.

PRELIMINARY TITLE SEARCH

A preliminary title search of the 77.5-acre Candlestick Park land was conducted to determine the nature of encumbrances upon the property. This search determined that a 4.25 acre parcel on the west edge of the stadium adjoining Jamestown Way must remain park land, otherwise a reversion clause would convey ownership back to the prior owner. This reduces the amount of marketable land for development to 73.25 acres.

LAND USE DISTRIBUTION

The distribution of land use (in gross acres) for the 5 alternatives evaluated is as follows:

ALTERNATIVE	STADIUM	HOUSING	OFFICE/COMMERCIAL	INDUSTRIAL	PARK	PARKING
1	-0-	16.0	57.25	-0-	4.25	-0-
2	-0-	-0-	38.25	35.0	4.25	-0-
3	-0-	52.0	21.25	-0-	4.25	-0-
4	-0-	11.0	8.00	54.25	4.25	-0-
5	16.5	5.0	12.70	-0-	-0-	43.3

Assuming that 17.5% of the gross land area is utilized by the street system and is evenly distributed over all land uses, the net land area which would be leased or sold would be as follows:

NET LAND AREA DISTRIBUTION

ALTERNATIVE	HOUSING	OFFICE/COMMERICAL	INDUSTIRAL	TOTAL
1	13.20	47.23	-0-	60.43
2	-0-	31.56	28.87	60.43
3	42.90	17.53	-0-	60.43
4	9.07	6.60	44.76	60.43
5	4.13	10.48	-0-	14.61

ALTERNATIVE DEVELOPMENT PROGRAMS

Following is a summary of the net land area development program for each alternative and the corresponding level of density.

Alternative 1:

LAND USE CATEGORY	LOT AREA (Acres)	LOT AREA (000 sf.)	UNITS	BUILDING AREA (000 sf.)	LOT AREA (Per Unit)	FAR
Housing	13.20	575	320	320	1,788	.56
Office/Commercial	47.23	2,057	-0-	1,258	-0-	.61
TOTAL	60.43	2,632	320	1,578	1,788	.60

The housing density in alternative 1 would approximate that of an RH-2 district (1500 sf./unit) which is the same as some nearby residential densities. The office/commercial FAR is significantly below that of any existing zoning district.

Alternative 2:

LAND USE CATEGORY	LOT AREA (Acres)	LOT AREA (000 sf.)	BUILDING AREA (000 sf.)	FAR
Office/Commercial	31.56	1,375	800	.58
Industrial	28.87	1,258	450	.36
Total	60.43	2,633	1,250	.47

Alternative 3:

LAND USE CATEGORY	LOT AREA (Acres)	LOT AREA (000 sf.)	UNITS	BUILDING AREA (000 sf.)	LOT AREA (Unit)	FAR
Housing:						
High Density	13.61	593	1,650	1,650	357	2.78
Medium Density	27.64	1,204	1,340	1,340	893	1.11
Low Density	1.65	72	40	40	1,775	.56
Subtotal	42.90	1,869	3,030	3,030	613	1.62
Office/Commercial	17.53	764	-0-	474	-0-	.62
TOTAL	60.43	2,633	3,030	3,504	613	1.33

The high density housing in alternative 3 would be slightly more dense than an RM-3 or RC-3 district (400 sf./unit). The medium density is slightly less dense than an RM-1 or RC-1 district (800 sf./unit) and the low density is equivalent to RH-2 (1,500 sf./unit). This alternative would produce the greatest amount of building area.

Alternative 4:

LAND USE CATEGORY	LOT AREA (ACRES)	LOT AREA (000sf.)	UNITS	BUILDING AREA (000 sf.)	LOT AREA (Per Unit)	FAR
Housing	9.07	395	220	220	1,786	.56
Office/Commercial	6.60	287	-0-	392	-0-	1.37
Industrial	44.76	1,950	-0-	585	-0-	.30
Total	60.43	2,632	220	1,197	1,786	.45

In terms of overall FAR, this is the lowest intensity of development for the 5 alternatives.

Alternative 5:

LAND USE CATEGORY	LOT AREA (Acres)	LOT AREA (000sf.)	UNITS	BUILDING AREA (000 sf.)	LOT AREA (Per Unit)	FAR
Housing	4.13	180	500	500	358	2.78
Office/Commercial	10.48	456	-0-	1,100	-0-	2.41
TOTAL	14.61	636	500	1,600	358	2.52

In terms of overall FAR, this is the most intensive of the development alternatives.

LAND VALUES

In estimating the land value consideration was given to existing and proposed projects in the general area that will impact any alternate use of Candlestick Stadium Site. The more significant projects are as follows:

1) The Executive Park Complex south of Candlestick Park which is proposed to be expanded to include more office, housing, convention and hotel facilities.

2) Sierra Point Office Park in Brisbane which is to have 1.5 million square feet of warehouse space and a marina.

3) Southern Pacific's proposed 500 acre project in Brisbane. This proposed development plan calls for 1.0 million square feet of office space, 700,000 square feet of industrial and research and development space, and 2.0 million to 2.5 million square feet of light industrial. It is anticipated that this project will be developed over a 10 to 20 period.

4) The India Basin Redevelopment Project which had 81 saleable acres of which 95% have been sold. Industrial sites are available at $5.00 per square foot with street work and utilities in place. A 141,000 square foot commercial parcel, also located in India Basin, is available at $9.20 a square foot.

5) Southern Pacific's 195 acre $4.2 billion Mission Bay Project which calls for 11.8 million square feet of office space, 6.0 million square feet of reseach and development space and 7,250 housing units. It is anticipated to take 20 years to complete this project.

In addition to considering the impact of such developments, the potential use of the site and a number of sales of large parcels of land in San Francisco, the Peninsula, and East Bay were reviewed with realtors, developers, and independent appraisers.

All of the foregoing data and opinions of those consulted point to Alternative 4 with a combination of housing, office space, and light industry, with emphasis on a high-tech industrial park as being the most feasible and marketable development.

The land sales reviewed indicate that the current market value for such a combined use on this site would be approximately $13.5 million ($5.00/sq. ft. net useable area). Demolition costs of $1 million will reduce the value of the land to about $12.5 million (($4.60/sq.ft. net useable area).

TAX INCREMENTS

The development program for the reuse of Candlestick Park could produce an incremental increase in tax revenues if a new stadium were to be constructed

downtown. This incremental increase could be a means for offsetting land value losses and an additional source of funds for the new stadium project. Tax increases which would result from the development program would include property, payroll, sales and business taxes.

Assuming an average unit size of 1,200 square feet and construction costs of $65 per square foot each unit construction cost would be $78,000. At a constant tax rate of 1.17%, the annual property tax revenues produced would be about $910 per housing unit.

Office and industrial development will include property, payroll, sales and business taxes. Assuming $90 per square foot construction costs and a constant 1.17% property tax rate, the total annual property tax yield for each 1,000 square feet of office space constructed will be $1,053.

Assuming an office employment density of 3 persons per 1,000 gross square feet and an average annual salary of $18,000, the payroll taxes generated at a 1% rate for each 1,000 square feet of office space will be $540 increasing the tax yield to about $1,600 per 1,000 square feet. Depending upon the type of use, business or sales taxes would increase the reveune return even more.

For industrial space a $50 per square foot construction cost estimate would yield property tax revenues of $585 for each 1,000 square feet. Assuming a less dense employment density of 2 persons per 1,000 gross square feet and an average annual salary of $20,000, the payroll taxes would be $400 per 1,000 square feet increasing the potential revenue return to $985 per 1,000 square feet. Again, depending upon the type of use, business or sales taxes would increase revenues even more.

Using annual revenue returns of $910 per housing unit, $1,600 per 1,000 square feet of office space and $985 per 1,000 square feet of industrial space, the minimum potential revenue return to the City from the five alternative development programs evaluated is as follows:

TAX REVENUES ($ Millions)

ALTERNATIVE	HOUSING	OFFICE	INDUSTRIAL	TOTAL
1	.29	2.01	-0-	2.30
2	-0-	1.28	.44	1.72
3	2.75	.76	-0-	3.51
4	.20	.63	.57	1.40
5	.46	1.60	-0-	2.06

It should be noted that a portion of this revenue would be required to retire the costs of providing the infrastructure necessary for development of the property.

RR:ec
May 23, 1983
4040A

2. DESIGN and ENGINEERING

A. SCOPE

The Task Force has been charged with the responsibility of investigating the logical alternatives for the future of Candlestick Park. The data contained herein attempts to pinpoint the major impacts of urban design, architecture and engineering. It attemps to answer the questions of what can be logically done with the site should a downtown stadium be built and what can physically be done to the existing structure should the City decide to renovate Candlestick.

Several alternate land uses were explored - eight of these appear to give a fair representation of the range of possibilities and are demonstrated below.

A new stadium at this site is also a possibility. The major unanswered question is what to do about parking while a new structure is being built in the existing parking lot.

Many solutions to renovating and/or doming have been proposed over the years. It is the belief of the study team that the more viable of these schemes have been reviewed and presented herein. In addition the study team itself has designed a solution to the retrofitting of the existing structure. This solution is unique in that it determines that the existing structure can be used to support a light weight fabric roof. Due to the fact that the original design did not envision the added load of a roof, this scheme achieves credibility through the fact that the fabric material is light and would gain major support from a pressurized air system (similar to Pontiac and Metrodome Stadia).

B. DATA

The data regarding these design studies was collected from the following sources:

1. Existing plans, specifications and as-built drawings for Candlestick; City architect's office.

2. Perimeter Security Survey of Candlestick Park (and Addendum) - February, 1972.

3. Enforcement and Evaluation program at Candlestick Park; San Francisco Police Department - May 1973.

4. Candlestick/Shoreline Park Report; San Francisco Department of City Planning - 1976.

5. Soils reports by Dames & Moore, Soil Mechanics Engineers - Oct. 1958, May 1969, Sept. 1969, Feb. 1970 and Aug. 1970.

6. The Assessment of Conditions at Candlestick Park and recommended improvements commissioned by the San Francisco Giants, by Whistler-Patri Architects, 1977.

Additional data regarding the construction of the stadium was obtained from the contractor of the second phase - Williams and Burrows, Inc. of Belmont, CA.

Further help and advice was obtained from the Owens Corning Fiberglass Company, manufacturers and/or installers of most of the contemporary fabric roof structures in the world.

Finally, several major private developers were helpful in reviewing and formulating the programs for the land use studies. These parties, all of whom wish to remain anonymous, are developers of major projects within the general area of Candlestick Park.

C. ALTERNATIVES

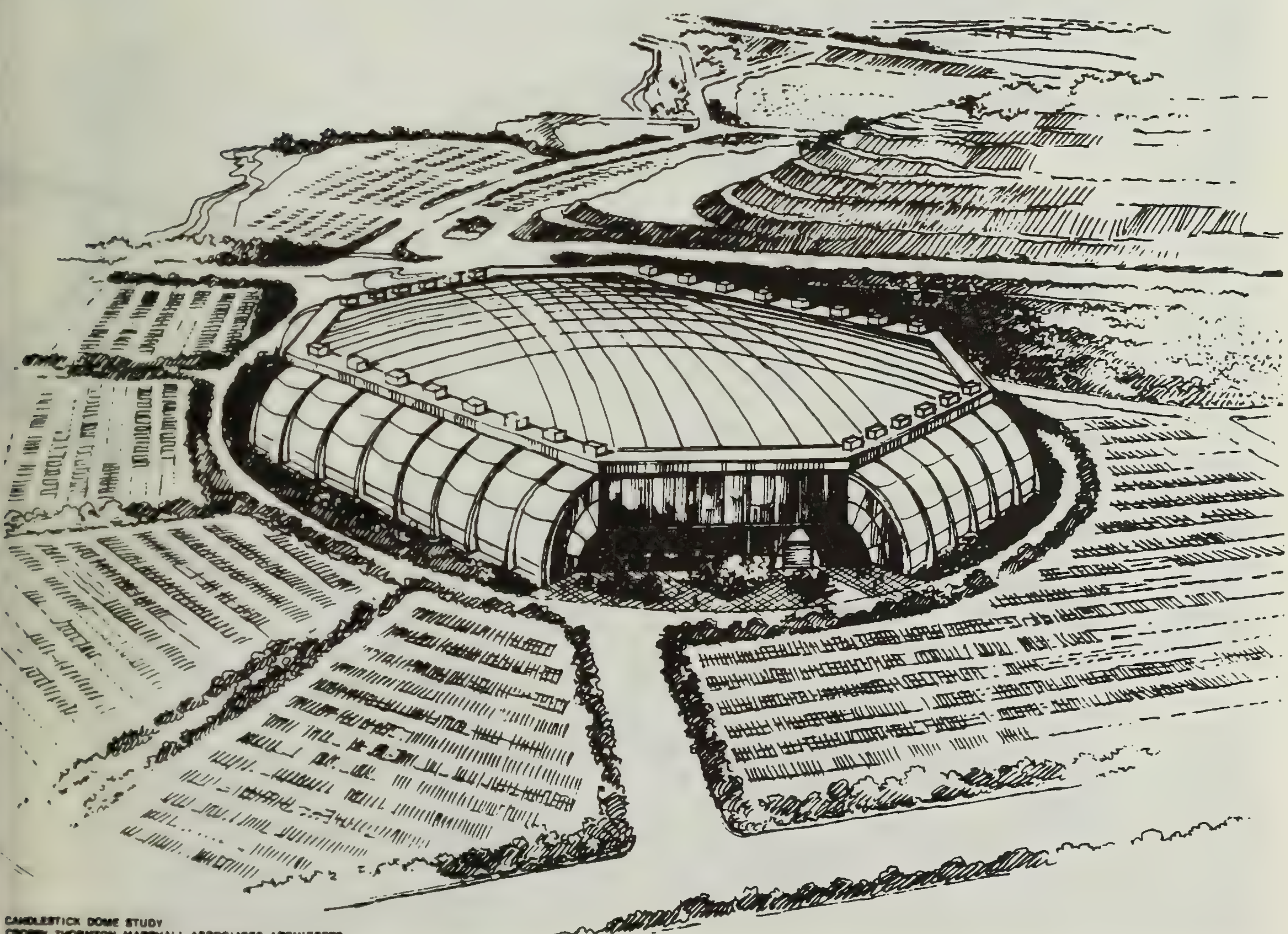
Of the many studies that have been made for doming Candlestick Park, the following represent some of the more logical alternatives.

1. <u>Crosby Thornton Marshall Associates Study</u>, prepared in 1982.

This study called for major renovation of the existing structure to improve toilet facilities, improve and add concession/food service facilities, new advertising display boards, new score board, new sound systems, new signage and graphics, as well as improvements to public service areas, existing boxes, press area and public concourses. This scheme also called for enclosing the structure with a dome, a new synthetic turf playing field and provision for staging a broader range of athletic events. Improvements to luxury boxes, team areas and the Stadium Club were not included.

Estimated Costs (1982 dollars):

Improvements and renovation work---------	$24,000,000
Dome and enclosure of concourses---------	31,000,000
TOTAL	$55,000,000



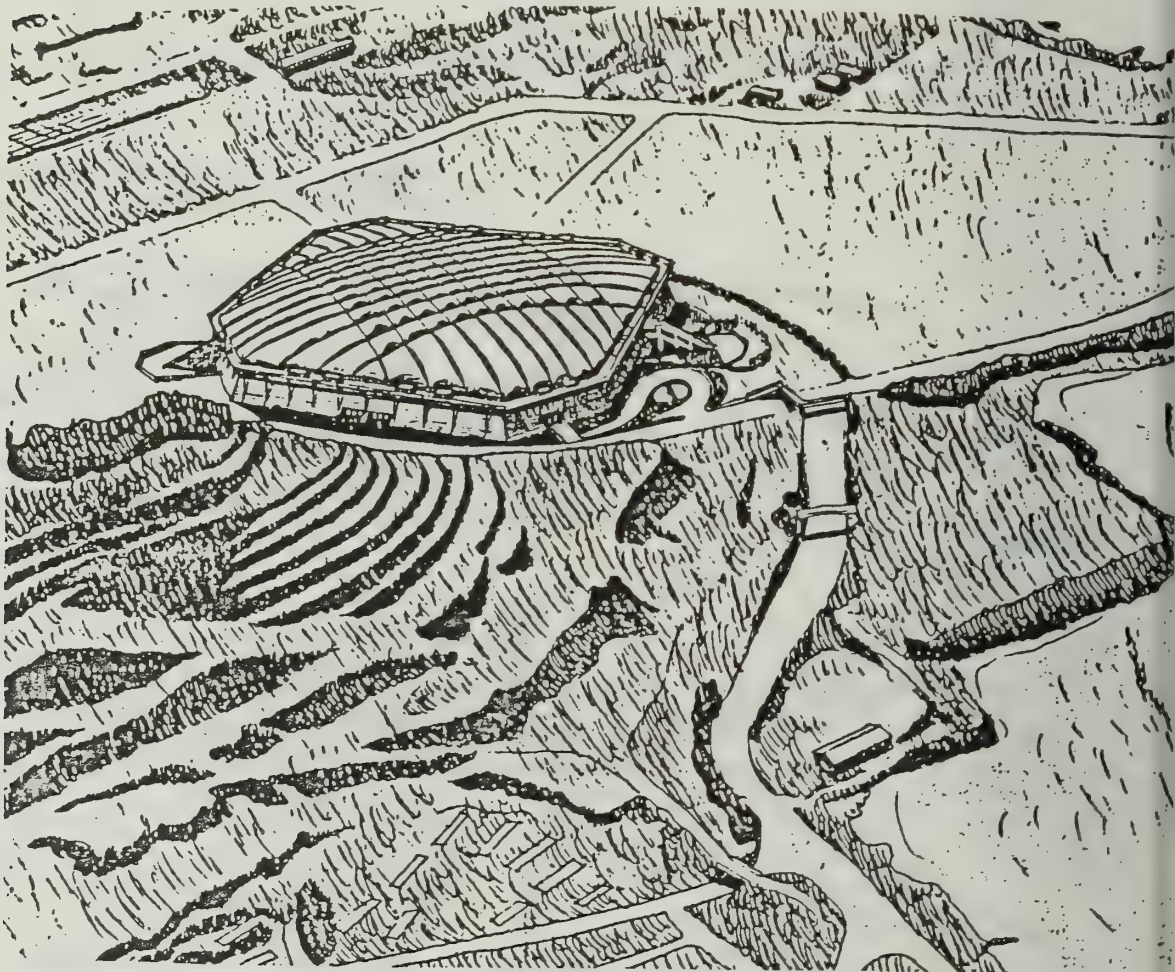
CANDLESTICK DOME STUDY
CROSBY THORNTON MARSHALL ASSOCIATES ARCHITECTS

2. Barton/Malow Study, prepared in 1982.

The study called for a program similar to that proposed by Crosby Thornton Marshall Associates. Proposed improvements included a new fabric and cable air-supported dome with new enclosure walls, new mechanical and electrical systems, reworking of ramp systems, improvements to interior spaces, sound system, graphics and new artifical turf. Improvements to luxury boxes, team areas and the Stadium Club were not included.

Estimated Costs (1982 dollars):

Renovations and improvements	$18,000,000
Dome and enclosure of concourses	29,000,000
TOTAL	$47,000,000*



*Note: Costs for this study have been updated in Section A3 - Building Construction Costs.

3. <u>Reid and Tarics Study</u>, preparation date uncertain.

This proposal called for a circular dome constructed of an assembly of concrete hinged arches, roofed with conical monitors which provide natural lighting to the interior. The mechanical ventilation system would be integrated into the structural frame by using hollow arches as ducts for air distribution. The scheme appears to provide cover, but not enclosure, for the concourse and pedestrian accessways.

No additional renovation program was proposed in this submittal.

No construction costs were made available.

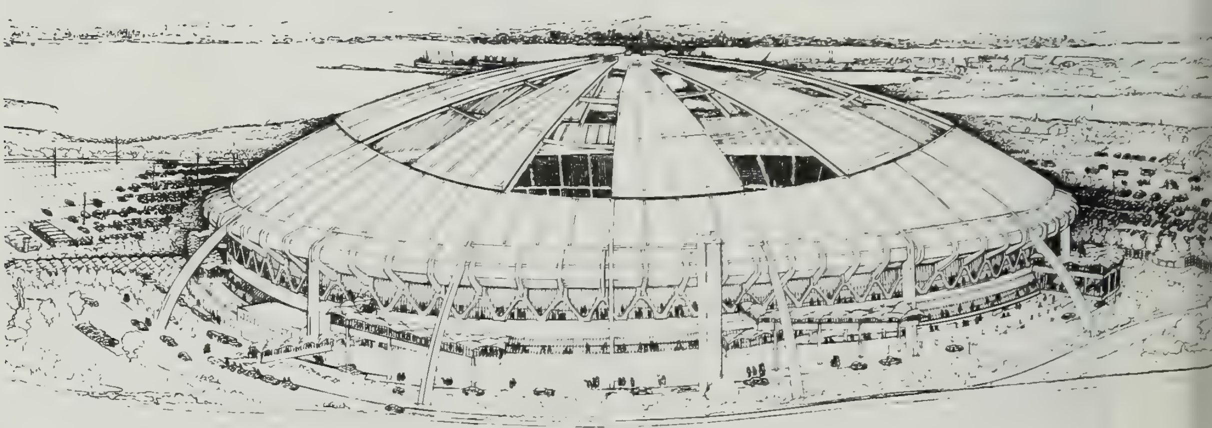
4. Rollamatic Study, prepared in 1983.

The proposal submitted by Rollamatic Roofs, Inc., called for a dome structure to be supported on concrete arches. The upper section of the roof would be supported by concrete or unprotected steel members forming a dome. The center section of the dome would be operable to allow for a circular opening of approximately 300 feet in diameter. The "infill" sections between the structural supports would be of plastic "glazing" materials, a sandwich panel typically used in Rollamatic's operable skylight sections.

The proposal states that, due to the ability of the roof to open easily, and due to the provision of natural light through the glazed roof panels, ventilating, heating and electrical energy costs would be held to a minimum.

No renovations beyond the dome and enclosure of the concourse were estimated.

Cost of dome and enclosure of
concourse, etc. (1983 dollars)-----------$25,000,000



5. "Plastic" Dome Study, submitted in 1983.

Pyroite/California, Inc. has proposed a dome structure comprised of composite beams* and rigid composite roof panels. The beams are to be fabricated either as tubular double wall structures (10' x 5') or trusses of tubular elements, mechanically joined. The roof panels would be of single or double wall construction and would be sealed to be watertight. Roof structure support at the building periphery would be of steel and/or concrete.

No renovation and/or improvement work was included in this proposal.

No enclosure for the exterior ramps, concourses or public accessways was included.

Cost of dome only (1983 dollars)---------$20,000,000

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* The Pyroite proposal does not state which of the available plastic materials would be used in this scheme.

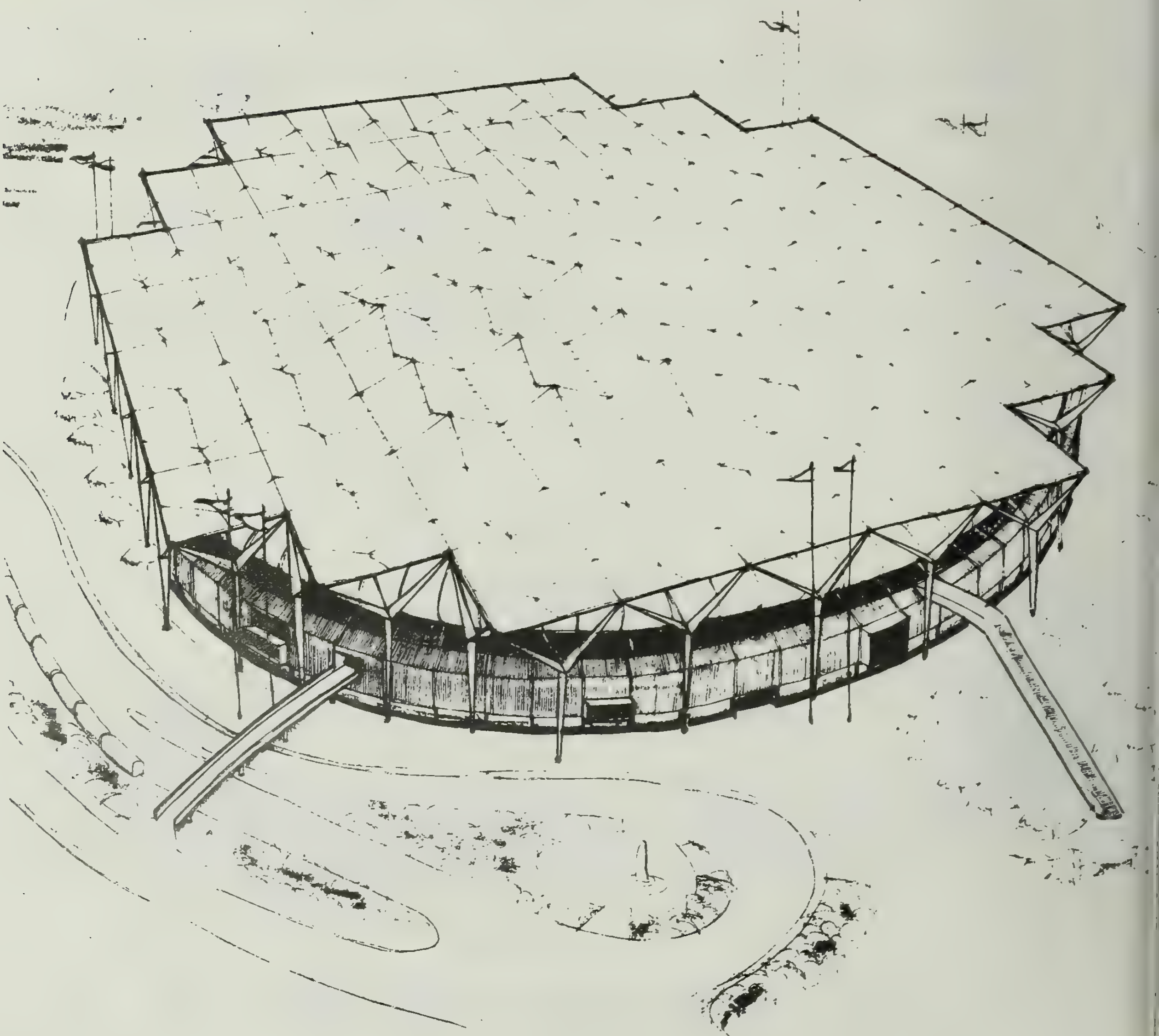
6. Daniel F. Tulley Assoc. Proposal - prepared in 1982.

Proposal called for a clear-span Hypor Shell system to cover the existing structure and an "expansion" of the existing concourses.

No additional renovation work called for in this proposal.

Cost estimate (1982 dollars):

Dome and concourses only------------------$16,000,000

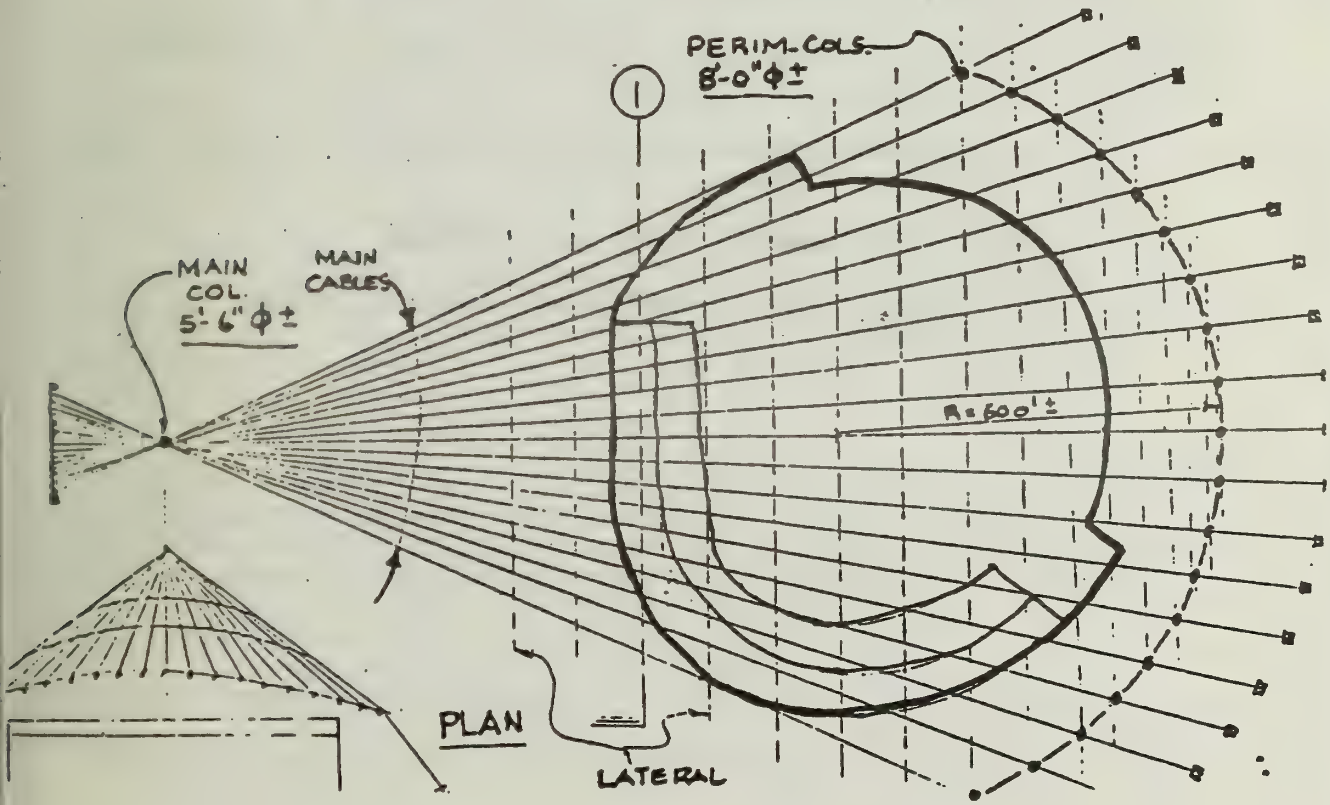


7. Ephraim Hirsch Proposal

The date of the Hirsch study is not certain, however it appears that it was done some time before the phase 2 expansion of Candlestick Park (in the late 60's). A sketch of this study is included in this report because it represents a genre of innovative studies that have been performed over the past decade or so. It is also a novel approach to the problem in that it calls for anchoring the supports for a tension fabric roof cover completely outside of the stadium. The main "masts" to support the roof cable system would be located on the hill above the stadium and in the existing parking lot.

No enclosure of existing ramps and concourses was proposed. No further renovation or improvements to the stadium were proposed.

No cost proposal was found in the files.



GEOTECHNICAL

A. SCOPE

The study team has identified several landuse schemes for the Candlestick site. Basically, these are:

- Sell or lease Candlestick and develop the surrounding area (designated as Schemes 1, 2, 3 and 4)
- Renovate and dome Candlestick and develop the surrounding area (Scheme 5)
- Build a new stadium at Candlestick while the existing park remains in-use until completion; possibly develop the surrounding area (Schemes 6 and 7)
- Renovate and dome Candlestick (Scheme 8)

The team has selected Schemes 4, 5, 6 and 8 for detailed analyses.

The geotechnical engineering effort was limited to briefly reviewing data regarding soil conditions in the Candlestick Park area and evaluating their impact on proposed development schemes. The primary geotechnical considerations are:

1. The continuing settlement or subsidence of the ground surface in the area
2. Foundation support for a new stadium
3. The impact of soil conditions on surrounding development

B. DATA

The data sources used to determine the subsurface conditions at Candlestick Park were (1) published geological information, and (2) reports prepared for the existing Candlestick Park project.

C. ALTERNATIVES

(Not Applicable in the geotechnical engineering considerations)

D. ANALYSIS

The Candlestick Park site was developed by excavating a portion of a hill and filling the surrounding land. The stadium is founded on rock and/or firm soils. The subsurface conditions in the surrounding area, which is presently a parking lot, consists of fill underlain by up to 60 feet of soft, compressible Bay Mud. The fill consists of crushed rock, sand and clay obtained from nearby excavations. Underlying the Bay Mud are moderately stiff to stiff clayey soils and medium dense to dense sands which in turn are underlain by bedrock. In general, the Bay Mud layer thickens toward the east and south. The ground water level is at about elevation -8 feet, although this level fluctuates seasonally and with the tides.

The Bay Mud is consolidating or compressing under the weight of the fill placed to construct the parking lot, causing the ground surface to settle. Because of the formation of mud waves during fill placement, the fill thickness varies. This varying fill thickness in conjunction with natural variations in mud thickness results in continuing differential settlement of the present ground surface. It is judged that several feet of additional settlement will occur over the next 50 years.

1. Foundations for New Stadium

Based on current plans, a new stadium would have to be built in areas underlain by up to 60 feet of compressible Bay Mud. Any portion of a new heavy structure extending into the fill over Bay Mud areas would have to obtain support beneath the Bay Mud. Accordingly, the most likely type of foundation for a new stadium would be driven piles in the Bay Mud areas and spread type foundations where rock or firm soil exist. The piles would obtain support from friction and end-bearing in the stiff soils or rock beneath the Bay Mud. Although the depth to supporting soils varies, for planning purposes, it would be appropriate to assume that firm soil exists at Elevation -80 feet (City of San Francisco Datum).

The most common type of pile used locally is prestressed, precast concrete piles. A 100-ton pile would typically penetrate about 40 feet into supporting soils, thus having a tip elevation of about -120 feet. As the existing fill continues to settle, it will impose friction or downdrag loads on the piles. This condition must be considered in pile design, which will in effect reduce the net capacity of piles. For costing purposes, downdrag loads should be assumed to be 25 tons.

2. Development Around Candlestick Park

The area surrounding Candlestick Stadium could be developed. Because of continuing settlement of the ground surface, and the presence of compressible, Bay Mud soils, only very light structures could be supported on shallow foundations. All other structures will likely require pile foundations. "Light structures" would probably be limited to single-story, buildings which are somewhat settlement-tolerant. Underground services (water, sewer, etc.) will also have to be designed to accommodate continuing settlement or be pile supported. Because of the significant future settlement, higher than normal maintenance costs should be anticipated for roadways and utilities.

3. Doming of Candlestick Stadium

Placing a dome over the existing Candlestick Stadium will add some additional load to existing foundations. Because these foundations are bottomed in rock and/or stiff soils and because they have performed satisfactorily, it is likely that some small increase in load could be accommodated by the existing foundations. At worst, some new foundations may be required or existing foundations will have to be enlarged.

D. ANALYSIS

1. ARCHITECTURAL

The program and design data submitted here represents the study team's efforts to investigate a logical set of improvements and doming for Candlestick. It is an air support system that would require the removal of the upper portion of the existing wind screen. A new partial wall would be built in its place and a structural ring beam installed to support a cable restrained fabric roof.

The grass field would be replaced by synthetic turf. The concourse and ramp areas would be enclosed with new partial walls and roofs. All areas of the existing facility would be improved to contemporary standards and codes including toilet rooms, concession areas with new facilities added, team areas, offices, etc.

The enclosure would allow for an expanded range of events in addition to Baseball and Football, including (but not limited to) basketball, concerts, conventions, rodeos, circus, soccer, etc.

This scheme has been reviewed by representatives of both the City's building department and Fire Department. The City does not currently have building and fire code regulations that specifically cover all aspects of retrofitting of this magnitude. The City codes are in the process of revision at this time. The Code officials are satisfied that the issues related to proper life safety design can be resolved at the appropriate design development phase. They have stated that final code interpretation will most likely rest in the hands of the Board of Permit Appeals.

PROGRAM

The following represents a total program for the renovation of Candlestick Park. It is intended to identify a system of "redevelopment" which will bring this facility, as closely as possible, up to the standards of a new, contemporary facility. (See Vol II, section 2 for Program Comparisons.)

CANDLESTICK PARK FACILITY ANALYSIS AND PROGRAM FOR IMPROVEMENT

The purpose of this section is to examine Candlestick Park in terms of its potential to provide an enclosed multipurpose facility which would be competitive with other facilities recently constructed or under construction.

This section will also define situations and conditions which cannot be made equitable with a new facility.

Past studies (refer to appropriate section in study for an explanation) have used the concept of encapsulation to provide an enclosed facility. This examination will look at the ramifications of utilizing the existing structure to support an air inflated roof system and the installation of a "skin" over the outside of the existing construction for the vertical wall closures. This approach would minimize the volume of space enclosed.

The format for this examination of Candlestick will be as follows:

New Stadium	Candlestick
Noted in this column will be listed the facilities provided by building a new stadium.	Noted in this column will be listed the present accommodations provided at Candlestick for the related item.

Below the above relationships will be noted the improvements which can be made and how. If improvements cannot be made, it will be noted why and the parameters used in assessing this.

Refer to the new stadium program for additional information on the design parameters used. The following outline of facilities provided will relate to the new stadium program.

1. Spectator Facilities

A. Seating

New Stadium		Candlestick
Football	70,000	61,500
Baseball	50,000	57,700

There will be an increase of 8500 seats for football in a new stadium. The number of seats for baseball is adequate in either stadium.

Filling alternate box seat aisles with removable seating for football would add approximately 1500 seats at the lower deck and 900 seats at the upper deck. This provision would still fall short of the seating requirements for holding an event such as the Super Bowl.

Some seating could be added in the outfield and end zone area if the scoreboard were to be relocated, possibly to the upper deck, but an equivalent number of seats would be eliminated in that area.

In general, there is no ability to provide seating equivalent to that for a new stadium at Candlestick.

B. Public Toilets

New Stadium			Candlestick			
70,000 seats			61,500 seats			
			Existing		Required	
	42,000 Men	28,000 Women	Men	Women	36,900 Men	24,600 Women
lav.	140	140	121	128	123	123
W.C.	84	280	116	214	74	246
Uri.	622 L.F.			826 L.F.	590 L.F.	

Actual fixture counts are close to adequate, but problems exist with distribution, spectator access to and circulation within the toilet rooms.

In conjunction with the addition of concession stands to be outside of the concourse, the existing concession stands would be converted to additional toilet rooms. In effect there would be a greater number of fixtures provided than required in order to compensate for other design inadequacies.

C. Concession Stands

New Stadium	Candlestick		
6 L.F./400 spectators	Existing		Required
1050 L.F.	Lower deck	294 lf	474 lf
	Promenade	144 lf	441 lf
	Upper deck	284 lf	

A shortage of approximately 200 lineal feet of concession stands exists at Candlestick to serve spectators. Add to the problem of minimal concourse widths, which make no provision for the stack-

ing of spectators in front of the stands, blocking traffic around the concourse.

No provisions exist within the present concession stands for stocking or prep areas and thus there is a constant requirement for restocking during events, creating additional congestion and hazards.

Solutions to this issue involve relocating concession stands to new space on the outside of a widened concourse which will then allow for the stacking of spectators without interfering with concourse traffic. Stands will be provided with space for prep areas and storage to eliminate restocking. Twelve new stands would be built at both the upper concourse and at the main concourse which will provide approximately 500 lineal feet of concessions at each of those levels.

D. Vendors Commissaries

No changes will be made to these facilities.

E. Ramps/Concourse

Ramps are narrow and provide minimum vehicular access to the concourse levels. An additional service elevator will be added in the outfield area to facilitate access.

Concourse widths are minimal. Spectator stacking in front of existing concession stands result in restricted flow around the stadium for spectators as well as service. With the relocation of concession stands toward the outside of the concourse and additional concourse width circulation will be improved.

F. Public Telephone

G. Ticket Booths

H. Turnstiles

No changes will be made other than the repair or replacement.

I. STADIUM SUITES

New Stadium	Candlestick
190 - 12 person suites 14' x 20' on two levels encircling the stadium.	66 - 8 person boxes 8' x 10' at promenade level distributed equally on both sides of home plate.

Several locations were examined for the addition of suites to Candlestick.

1. Enlarge existing boxes to provide suite ammenities.

2. Construct new suites down the left field line as an extension of the existing boxes around to the present scoreboard location.

3. Relocated the scoreboard and install suites in that location.

4. Construct new suites at the perimeter of the stadium at the top of the upper deck seating.

Following is an elaboration of the four options for the addition of suites.

1. <u>Enlarge Existing Boxes</u>

   If an additional 3' to 4' of floor were added to the front of the box at an elevation approximately 18" below the existing floor level and if the existing passageways at the rear of the boxes were modified, there would be space for upgrading the existing boxes to suites. A new stairway would be added every other bay to provide access from the upper passage corridor to the suite level approximately 5 ft. below. The new stairs would provide access to three suites each. 20-8 person boxes with fixed seating only and a bar, 28-8 person suites, 13-12 person suites, and 2-24 person suites, all with fixed seating, lounge seating and a bar area can be provided.

2. <u>Extend Existing Boxes Down Left Field Around to Scoreboard</u>

   16-8 person suites can be installed between column lines 48 and 60 without blocking the site lines of the existing seating. There is a 6 ft. differential in elevation between the suite floor and the existing corridor which requires the addition of stairs. Physically, the stairs cannot cross either a column line or the existing stair to the upper deck, thus 3 of the bays cannot accommodate suites. These suites are not in a prime location.

3. <u>Relocate Scoreboard</u>

   30-12 person suites on two levels can be accommodated in this location. The placement is less than desirable due to the outfield and end zone location.

   Provisions would need to be made for a new scoreboard location possibly in the upper deck thus eliminating seating there.

4. <u>New Suites at the Perimeter of the Top of the Upper Deck</u>

   This location would provide 1-12 person and 1-8 person suite bay with a total of 78-12 person and 78-8 person suites.

Site line distances are a minimum of 300 ft. and a maximum of 425 ft. to the center of the field at the 50 yard line or to second base. Both of these distances exceed design parameters. Approximately 5400 upper deck seats would be eliminated.

J. Loge Seating

New Stadium	Candlestick
8000 seats min.	Cannot accommodate.

K. Stadium Club

L. Hall of Fame

M. Restaurant

A complete upgrading and refurbishing of these facilities will be provided.

N. Security

No change required. Refurbish only.

O. First Aid

No changes required. Refurbish only.

P. Drinking Fountain

No changes required. Refurbish only.

Q. Sound System

A complete new sound system shall be provided.

R. Elevators

A new service elevator will be added in the outfield area.

S. Escalators

No change required.

T. Graphics

New graphics systems, informational and environmental, shall be provided throughout the stadium.

U. Lighting

Provide new general illumination throughout the stadium specifi-

cally at ramp and concourse areas.

V. Fire Protection

Upgrade existing system or provide new system as required for the facility by code.

W. Novelty Stands

Upgrade as required.

2. PRESS FACILITIES

Football

	New Stadium	Candlestick
Working Press	150-160 3000 SF	80 @ 2000 SF
T.V. Broadcast	2 @ 320 SF	280 SF
Broadcast	3 @ 120 SF	3 @ 100 SF
Coaches	2 @ 100 SF	2 @ 100 SF
Film	200 SF	6 spaces
P.A.	100 SF	100 SF
Work Room	200 SF	150 SF
Toilet	240 SF	200 SF
Owner Box	560 SF	
GM Box	280 SF	Boxes at Promenade
VIP Box	280 SF	
Security		100 SF
Press Club	2000 SF	300 SF

The football pressbox would require approximately 50% increase in area to be equal to a new facility excluding the boxes. This would necessitate a loss of spectator seating. No provision is being made for an increase in size, only for refurbishing.

Baseball

	New Stadium	Candlestick
Working Press	120-150 2400 SF	75-1000 SF
TV Broadcast	3 @320 SF	3 @ 100 SF
Broadcast	5 @120 SF	2 @ 100 SF
Film	300	200
Scoreboard	250	100
P.A. -Engineer	150	384
Workroom	200	
Toilets	240	In concourse
Press Club	2000	Remote
Owner Box	560	80
GM Box	280	80
VIP Box	280	80

Baseball facilities are inadequate by approximately 100% compared to a new stadium. Expanding the present facility would involve elimination of existing revenue generating boxes at this level. No provision has been made to increase the facility, only to renovate.

Common Facilities

Darkrooms - no change to existing.

Player Interview - new provision at field level.

Studio space - provide new space at promenade level.

3. ADMINISTRATIVE FACILITIES

A. Offices

New Stadium		Candlestick
Stadium Operations	2000 SF	
Baseball 10,000 +	2000 expansion	7500 SF
Football	2000 SF	3000 SF
Soccer	6000 SF	-
Basketball	6000 SF	-

All existing office spaces would be renovated and additional space at the promenade level would be furnished for office space for other sports.

B. Ticket Sales

	Candlestick
Stadium 1200 SF + 300 Expansion	
Baseball " "	2400 S.F.
Football " "	
Soccer " "	
Basketball" "	

Ticket office space would be developed for other sports as required at promenade level.

4. TEAM FACILITIES

New Stadium		Candlestick
A. Football Lockers	10,000 SF	3600 SF
B. Baseball Lockers	10,000 SF	7700 SF
C. Visitor lockers 2 @	2500 SF	3900 SF
D. Officials Locker 2 @	350 SF	200 SF

Remodel existing space and relocate Field Maintenance and other non-team facilities to the outfield area to provide the following:

Football lockers	7000 SF
Baseball lockers	8400 SF
Visitor lockers 2 @	2500 SF
Officials' locker 1 @	350 SF

These spaces are still below the programmed requirements of a new stadium, but the expense required for additional area is prohibitive.

E. Field Equipment Storage

No change.

F. Field Toilet

Provide facility in locker room area at field level.

G. Team Photographers Platform

Provide as required by networks.

H. X-Ray Room

Provide 200 SF at field level in locker room area.

I. Player's Relatives

No change.

5. STADIUM SERVICE FACILITIES

New Stadium		Candlestick
A. Concessionaire Storage	10,000 SF	25,000 SF
B. Concessionaire Lockers	2500 SF	
C. Stadium Personnel Lockers	2500 SF	5800 SF

No change to the above facilities.

D. Band Locker	3600 SF	

Build new space in outfield area.

E. Field Maintenance Storage	5000 SF	5200 SF

Relocate space to outfield area to allow expansion of team facilities.

H. Loading Dock

No change.

I. Trash Compactor

Provide new trash compactor and collection system.

J. Mechanical Equipment

Upgrade as required.

K. T.V. Van Parking

No change.

6. PLAYING FIELD FACILITIES

New Stadium	Candlestick
A. Playing Field synthetic/removable	Natural grass

Provide new synthetic turf system with underfloor electrical distribution system.

B,C,& D. Game Equipment

Provide new as required.

E. Player Dugouts

Direct team locker access	Home locker direct access - visitor access across field

No resolution to access problem.

F. Bull Pens

G. Batting Cage

H. Field Entrances

No change.

I. Field Lighting

Provide new system suspended from roof structure.

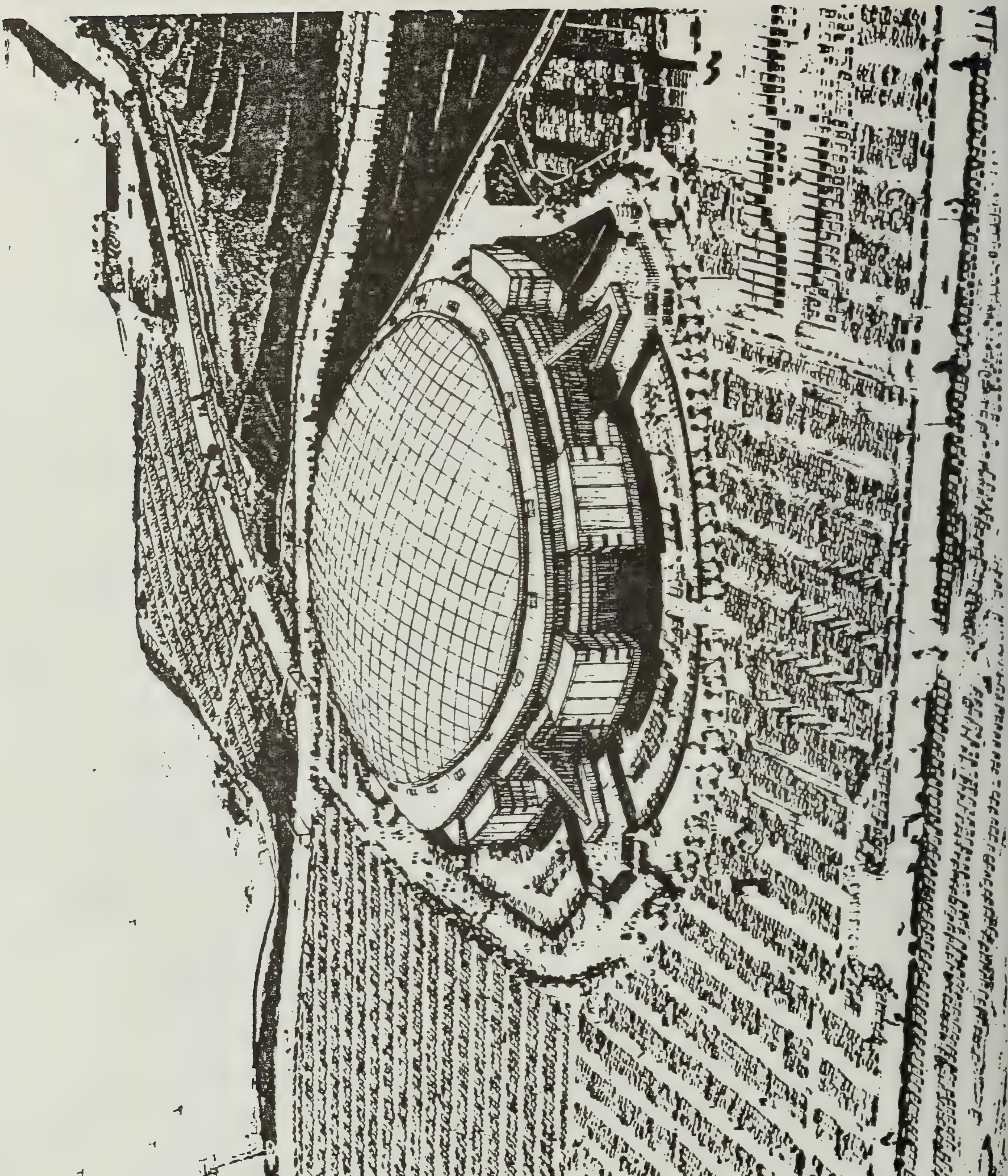
J. Scoreboard

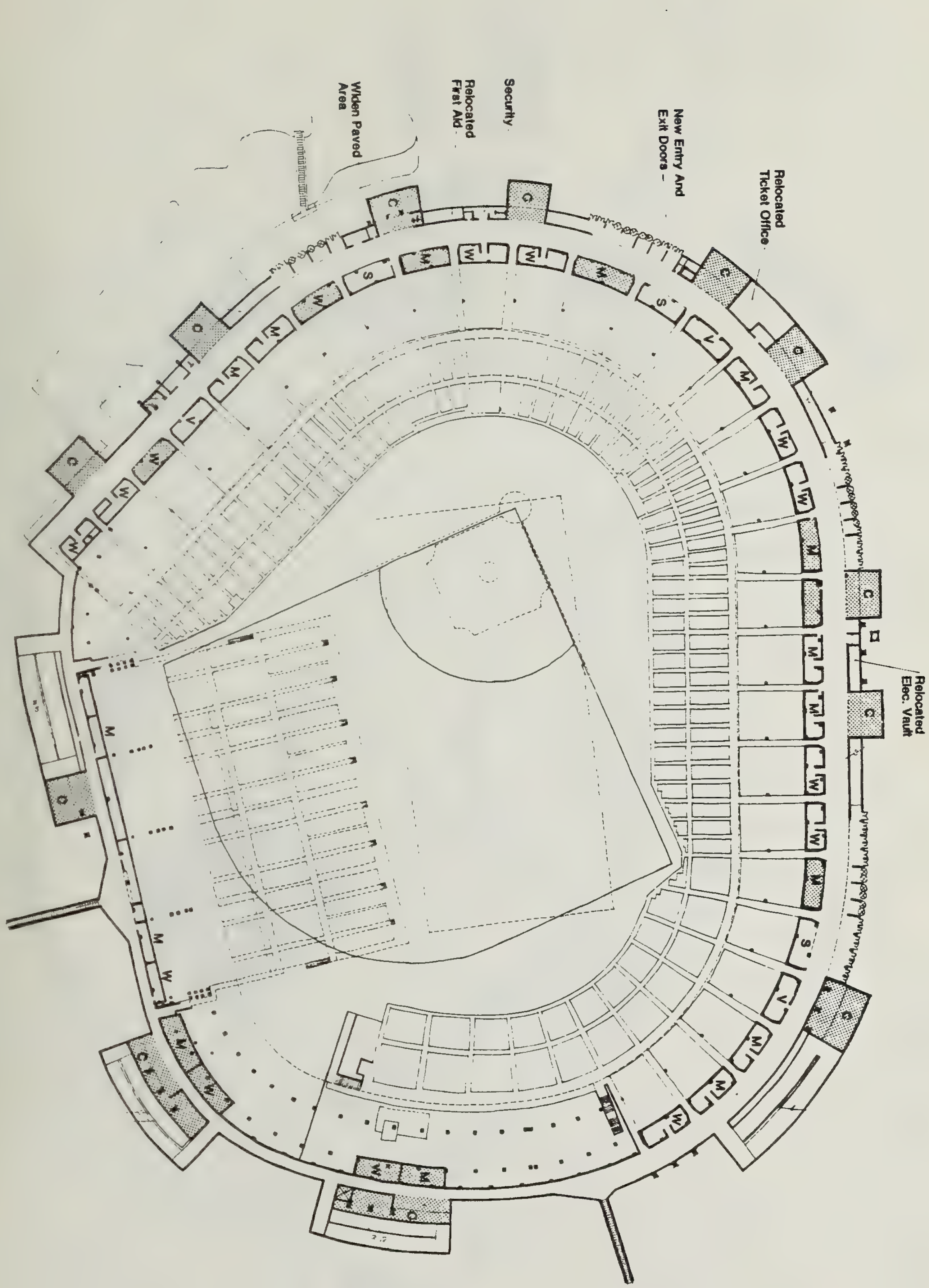
New Stadium	Candlestick
Color Matrix Board	B&W Matrix Board

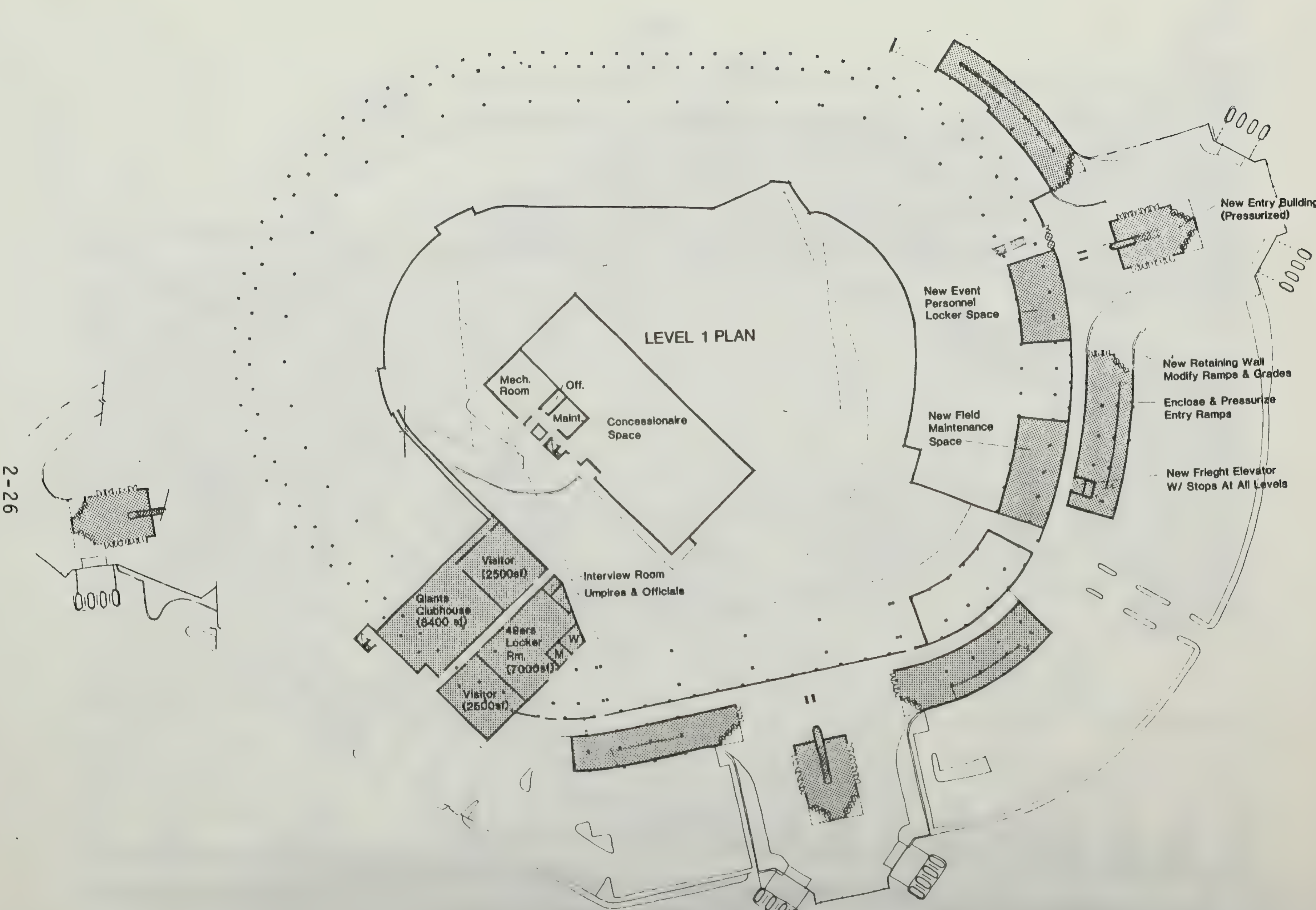
Provide new color matrix board.

K. Security

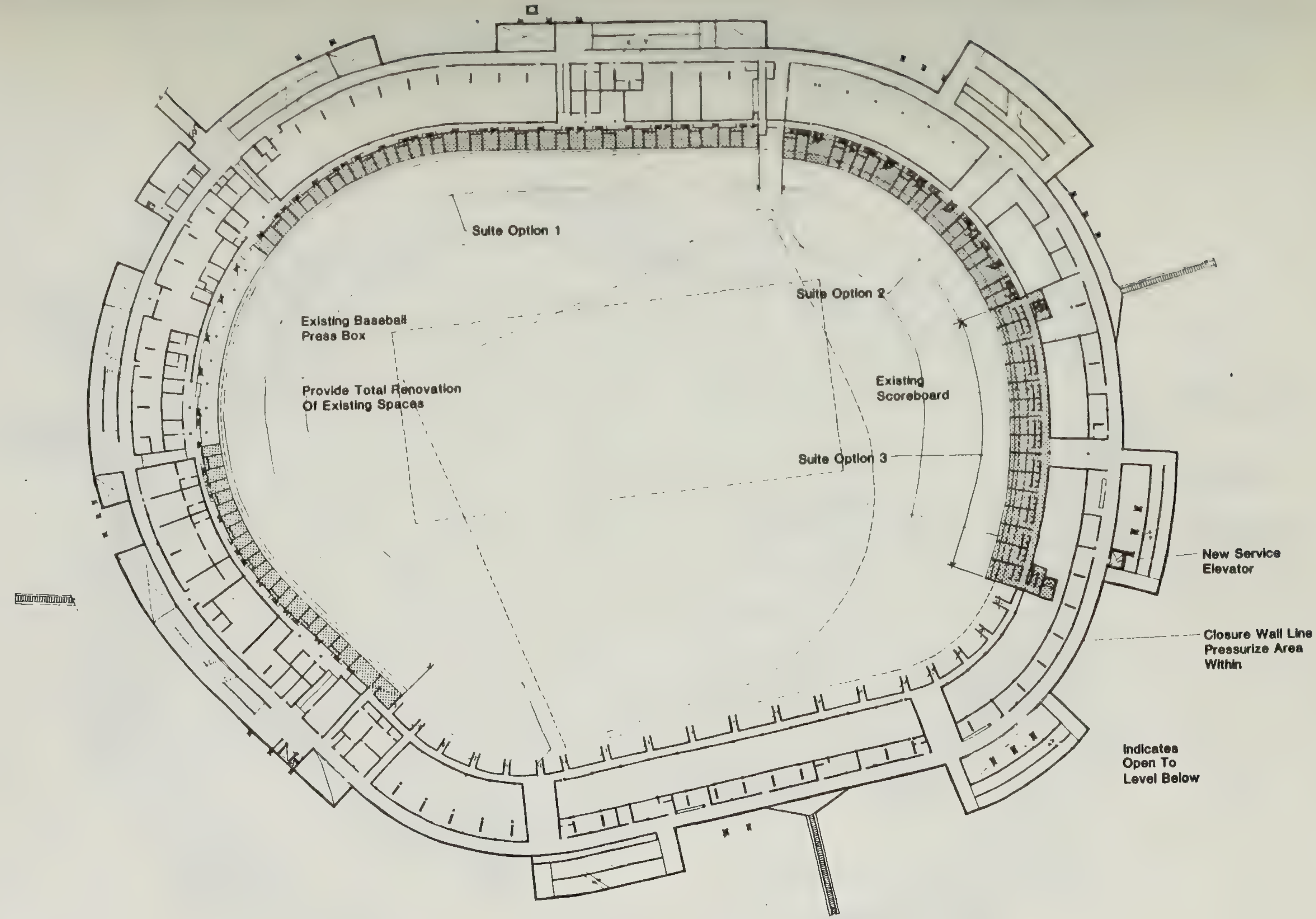
No change.



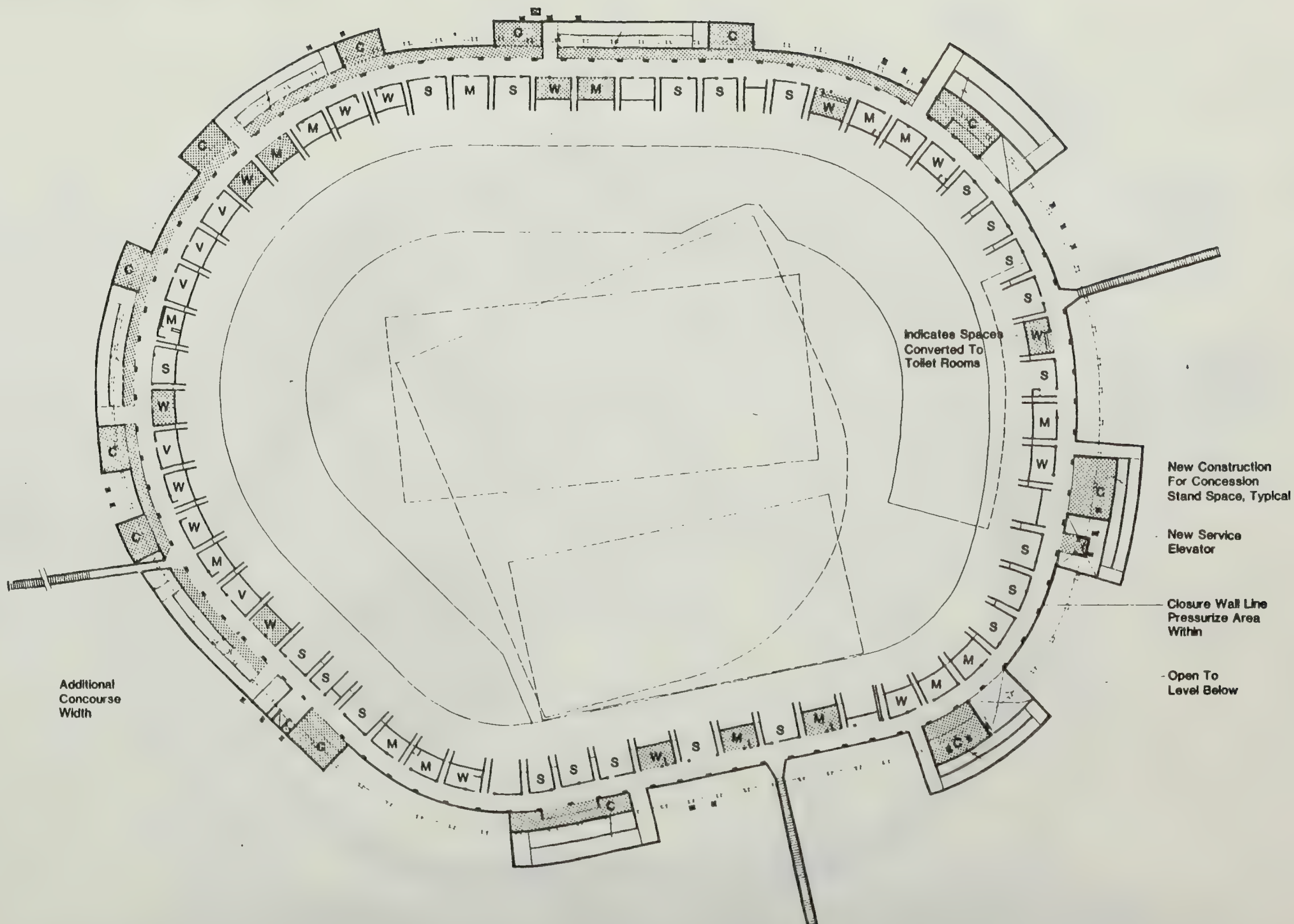

Relocated Ticket Office
New Entry And Exit Doors
Security
Relocated First Aid
Widen Paved Area
Relocated Elec. Vault



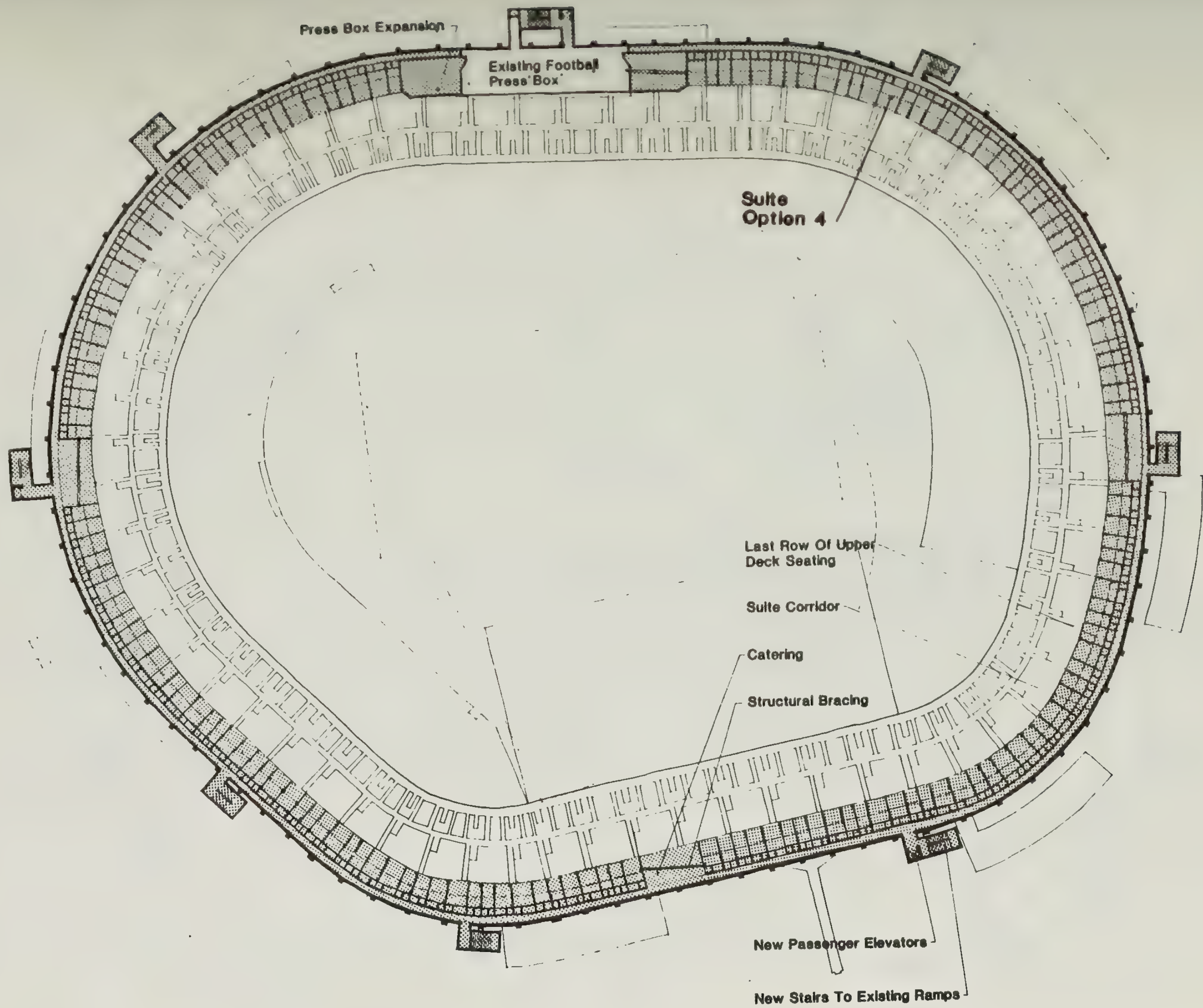
GROUND LEVEL PLAN



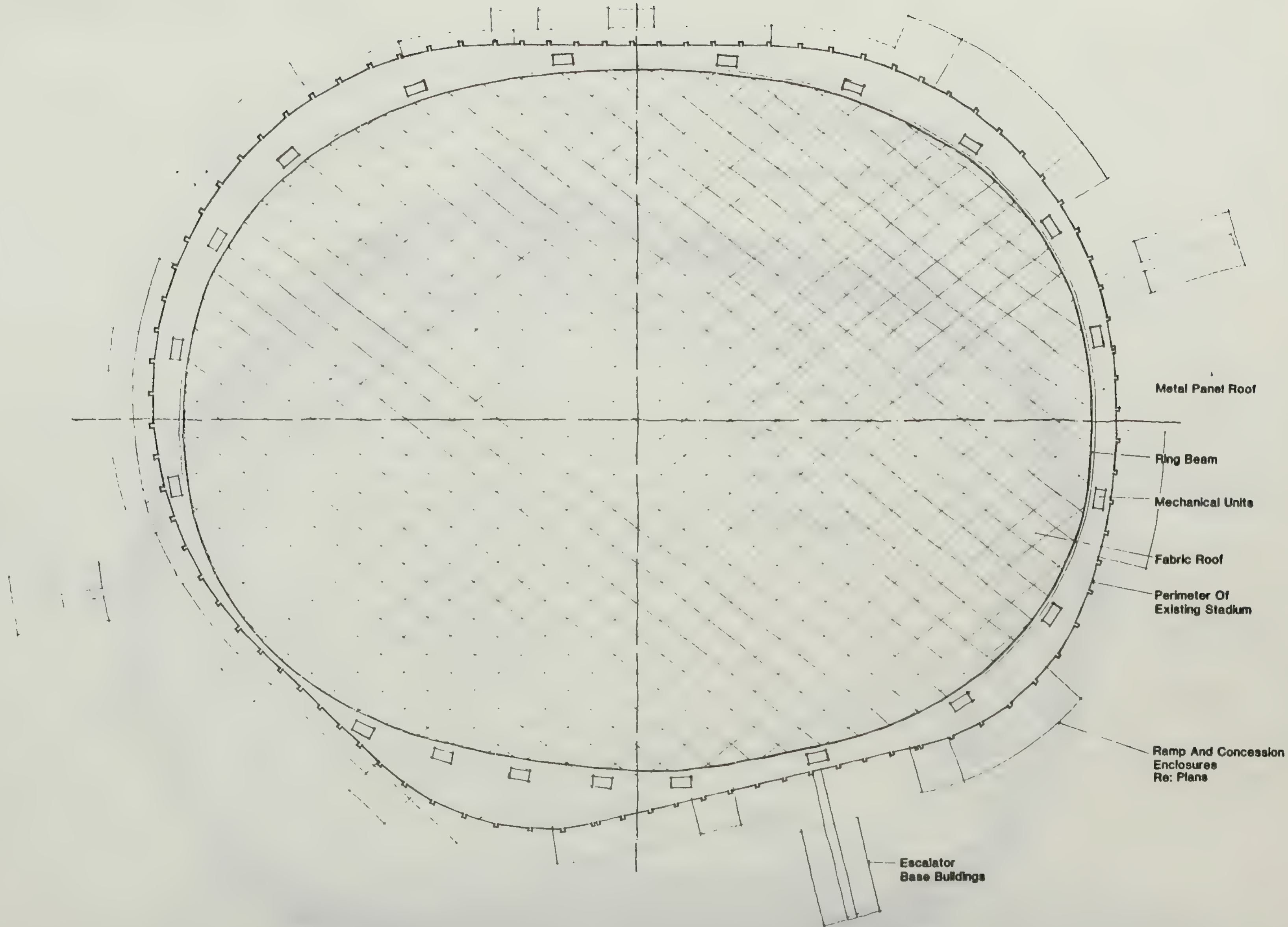
PROMENADE LEVEL PLAN



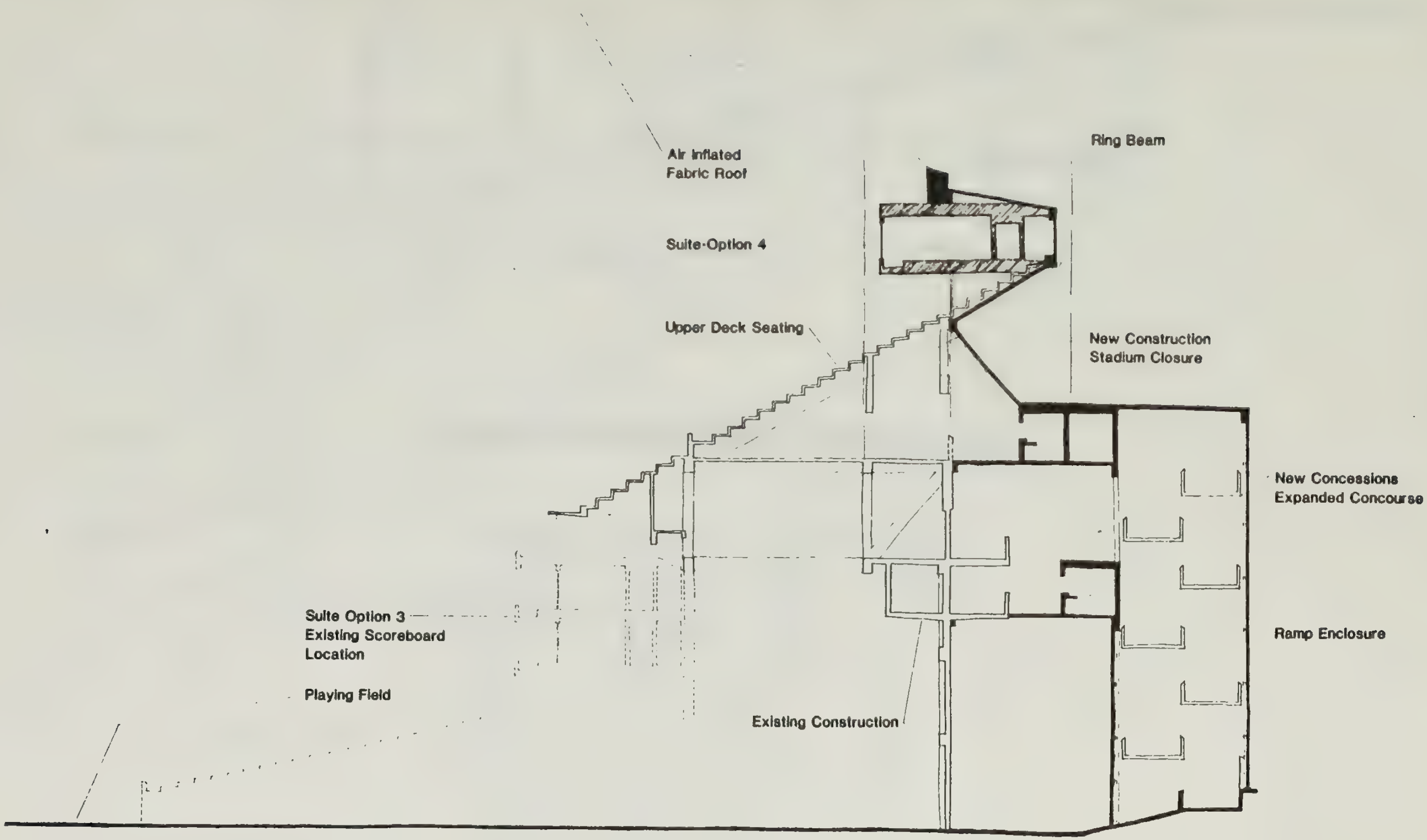
UPPER CONCOURSE PLAN



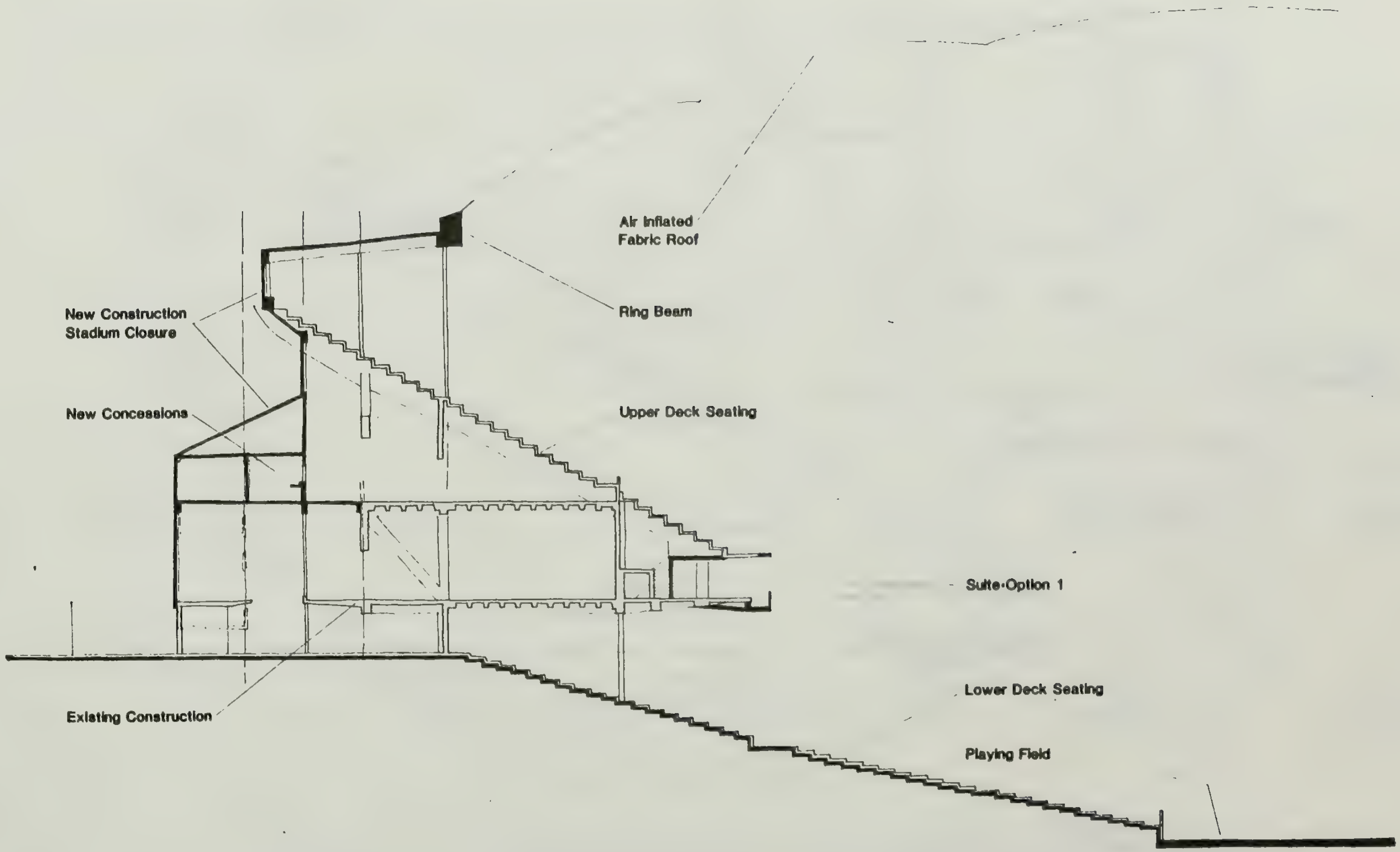
UPPER DECK SEATING PLAN


Metal Panel Roof
Ring Beam
Mechanical Units
Fabric Roof
Perimeter Of
Existing Stadium
Ramp And Concession
Enclosures
Re: Plans
Escalator
Base Buildings

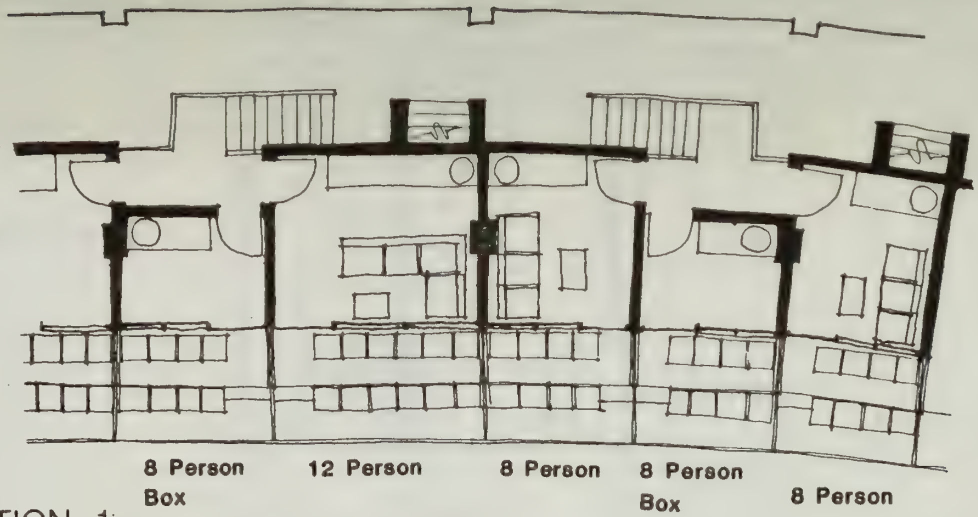
ROOF PLAN



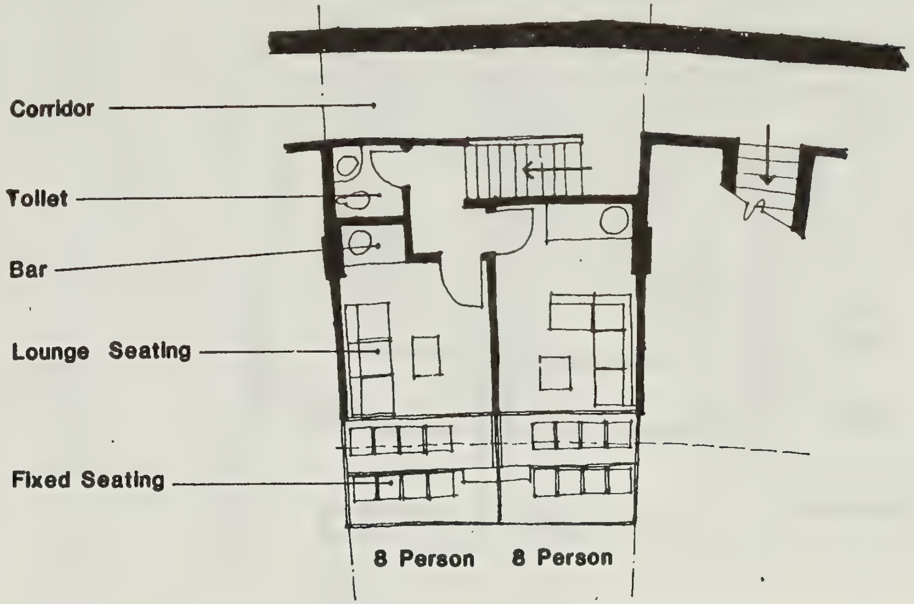
STADIUM SECTION EAST SIDE



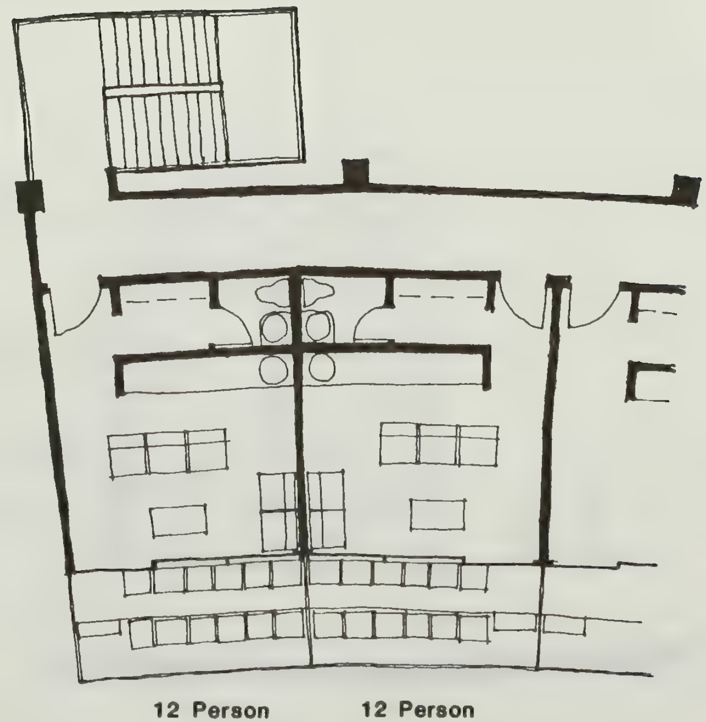
STADIUM SECTION WEST SIDE



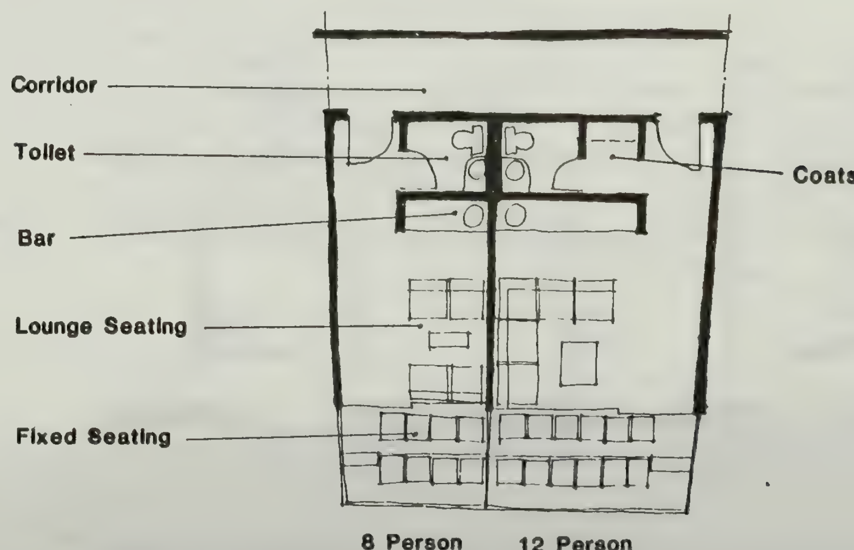
PLAN — SUITE OPTION 1



PLAN — SUITE OPTION 2



PLAN — SUITE OPTION 3



PLAN — SUITE OPTION 4

LAND USE ALTERNATIVES

The following represent land use alternatives for the 78 acre Candlestick site.
Note: 4.25 acres will revert to original owners if the stadium is removed from this site.

SCHEME NO. 1:

Assumes a new downtown stadium, sale or lease of the Candlestick site and mixed use development of housing and offices.

Housing:	16 acres at 20 dwelling units per acre	- 320 units
Offices:	57.75 acres of mid-rise construction at a floor area ratio of 1:0.5	- 1,257,800

COMMENTS: This scheme attempts to develop a buffer between the existing residential communities adjacent to the site and the new development. It would provide much needed housing and increased job opportunities. Several developers were contacted to solicit their opinions of this scheme. All those contacted stated that the current market would not absorb the office space proposed and that it would be 10 - 15 years before there would be a reasonable market.

SCHEME NO. 2:

Assumes a new downtown stadium, sale or lease of the Candlestick site and mixed use development of "high tech" light industrial and offices. It also assumes a small park to buffer the existing adjacent housing.

LIGHT INDUSTRIAL (HIGH TECH):	35 acres with 50% office, 50% warehouse/manufacturing at a floor area ratio of 1:0.3	- 450,000 s.f.
OFFICES:	36.75 acres of midrise offices at a floor area ratio of 1:0.5	- 800,400 s.f.

COMMENTS: Developers feel that there would be a good market for high tech/light industrial development. Consensus was that this is the most logical use of Candlestick land. Has good potential for creation of new jobs.

Does not fit compatably with adjacent residential neighborhood. Office market doubtful at present.

SCHEME NO. 3:

Assumes a new downtown stadium, sale or lease of the Candlestick site and mixed use development of housing and offices.

Housing area 1:	2 acres of low density at 20 dwelling units per acre --------------------------40 units
Housing area 2:	35.5 acres of medium density at 40 dwelling units per acre ------------------1340 units
Housing area 3:	16.5 acres of high density at 100 units per acre ----------------------------1650 units
TOTAL HOUSING	3030 units
Offices:	21.75 acres of office/commercial - midrise offices with 25% covered parking - 473,700 s.f.

COMMENTS: This scheme would maximize housing and give some relief to the City's critical need for new units. It would afford a major extension of the existing residential neighborhood on a much improved level.

Developers feel that the Redevelopment Agency would need to take an active role in this scheme in order to make housing viable. The office/commercial would "assist" housing by defraying some of the costs. The current market would not support office development of this magnitude.

SCHEME NO. 4:

Assumes a new downtown stadium, sale or lease of the Candlestick site and mixed use development of housing, offices and light industrial/high tech.

Housing: 11 acres at 20 dwelling units per acre ------220 units

Offices: 18 acres of midrise office buildings at a floor area ratio of 1:0.5 -----------392,000 s.f.

Light Industrial (High Tech): 44.75 acres with 50% office, 50% warehouse/manufacturing at a floor area ratio of 1:0.3 ---------------------------584,800 s.f.

COMMENTS: Of all of the alternate mixed use schemes, developers feel that this is the most logical in today's market. The high mix of light industrial/high tech would be absorbed quickly by the high demand for facilities of this sort in this general area.

Housing would provide a limited solution to the City's need.

The smaller mix of office space could be left to be developed when the market demand occurs in 15 - 20 years.

SCHEME NO. 5:

Assumes leaving the stadium at the Candlestick site, renovating it and covering it with a dome. Also assumes the sale or lease of the existing (City owned) parking lots for mixed-use development.

Stadium:	Multi-use domed stadium ------ 61,500 seats
Parking:	Six level parking structures to be jointly used for stadium and commercial/offices: 31 acres of parking at grade -----4000 cars 12.8 acres of structure parking-10,000 cars
Housing:	5.0 acres at 100 D.U. ------------500 units
Offices:	12.7 acres at F.A.R. of 1:0.5 - 1,000,000 s.f.
Commercial:	------------------------------50,000 s.f.
and Hotel:	--------------------------------400 rooms

COMMENTS: This scheme would allow the City to leave Candlestick in operation and could provide the funds to improve it by the sale or lease of the existing parking lots. The construction of shared parking decks could solve the parking problem at Candlestick.

Housing and jobs would be created by this scheme. The ability of the market to absorb office and commercial at this time is doubtful. Disruption to parking is a major factor and concern.

SCHEME NO. 6:

Assumes building a new stadium at the Candlestick site. Would require keeping existing park in use until new facilities are completed. Would use same program as for a downtown stadium.

Stadium: Multi-use domed facility - max capacity---70,000 seats

COMMENTS: This scheme represents the least cost for land acquisition of any of the "new stadium" schemes. Its major drawback would be that at least 50% of the parking in the existing lots would not be available for events for the two years (plus) that it would take to build a new stadium. Both the 49ers and the Giants have indicated that this would be unacceptable.

SCHEME NO. 7:

Makes all of the assumptions of Scheme No. 6 with the addition of sale or lease of lands surrounding the new stadium for mixed use development.

Stadium:	Multi-use domed facility - maximum capacity --------------70,000 seats
Housing:	5.0 acres at 100 D.U. per acre ---500 units
Offices:	12.7 acres at F.A.R. of 1:0.5 - 1,000,000 s.f.
Commercial:	--------------------------------50,000 s.f.
and Hotel:	----------------------------------400 rooms

COMMENTS: The advantages mentioned for Scheme No. 5 above apply here, i.e., new development would help pay for new stadium, etc. The disruption to parking and events would be a major factor that would have to be considered. Developers interviewed stated that there is very little or no current market for development of this nature and scale at this time. They feel that it would be 10 - 15 years before the market could begin to absorb offices and commercial of this magnitude.

SCHEME NO. 8:

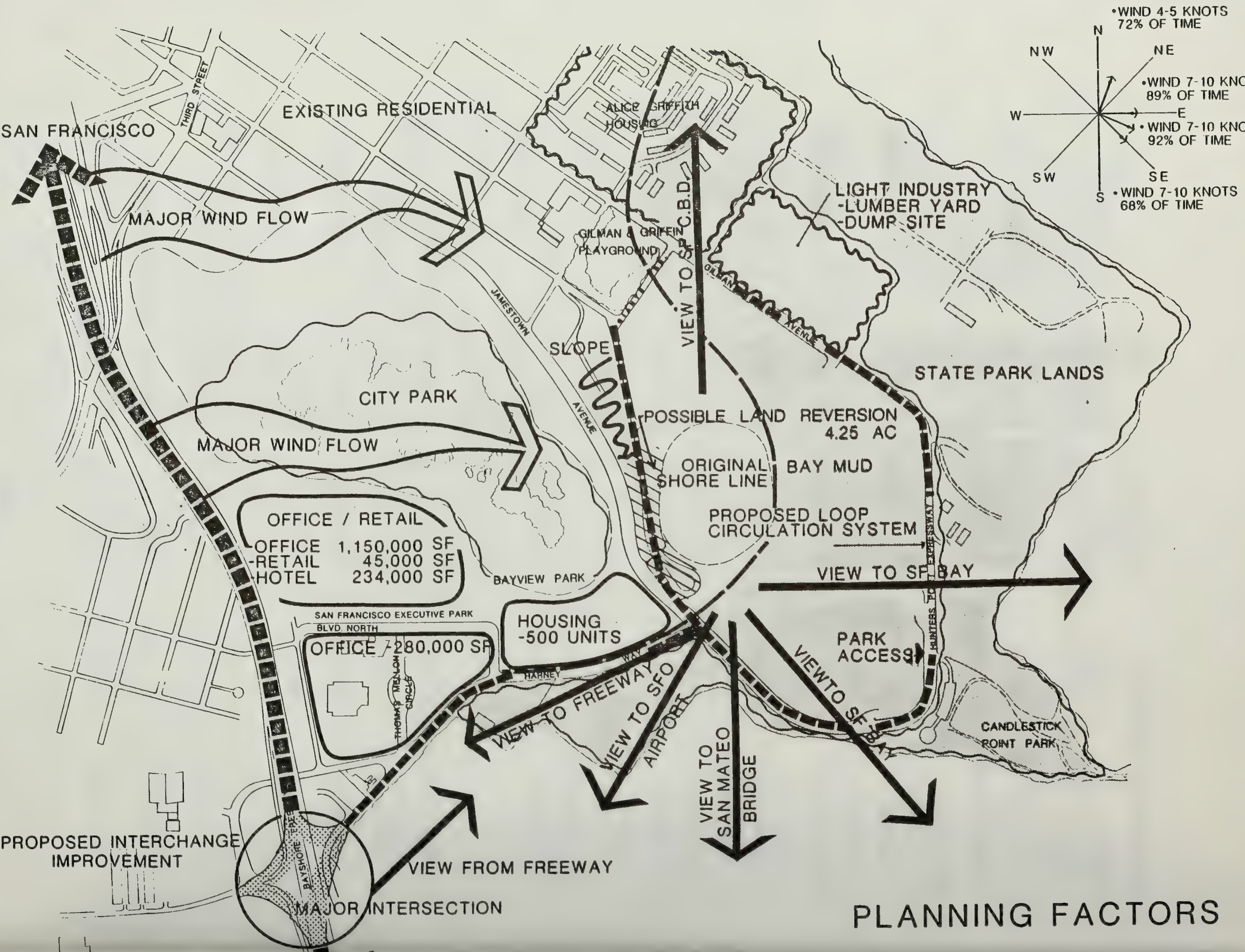
Assumes leaving Candlestick Park, renovating and doming existing structure.

Stadium:	Multi-use domed facility - maximum capacity --------------61,500 seats

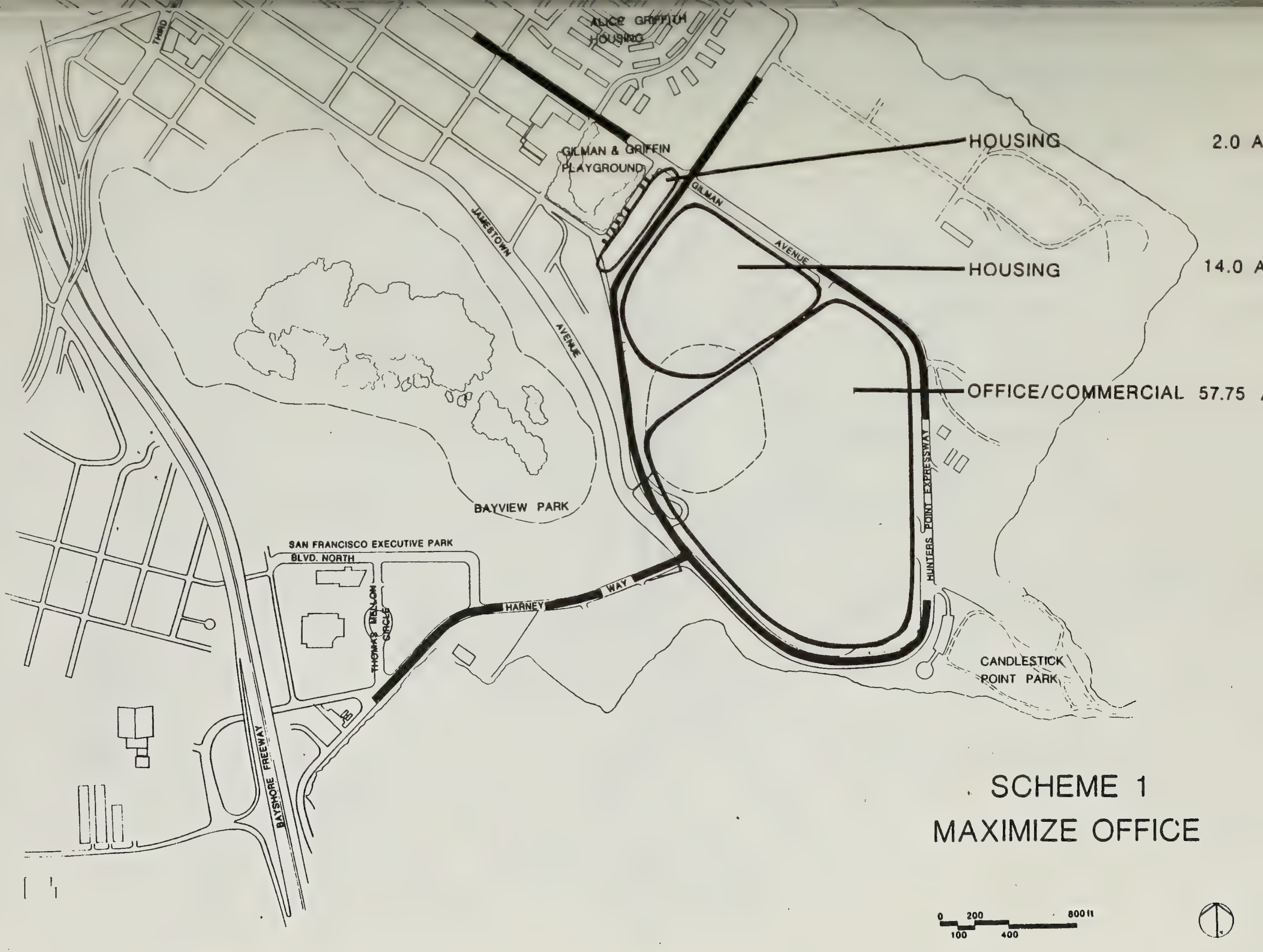
COMMENTS: The "details" of this scheme are described above and throughout the remainder of this report.

DEVELOPMENT SUMMARY

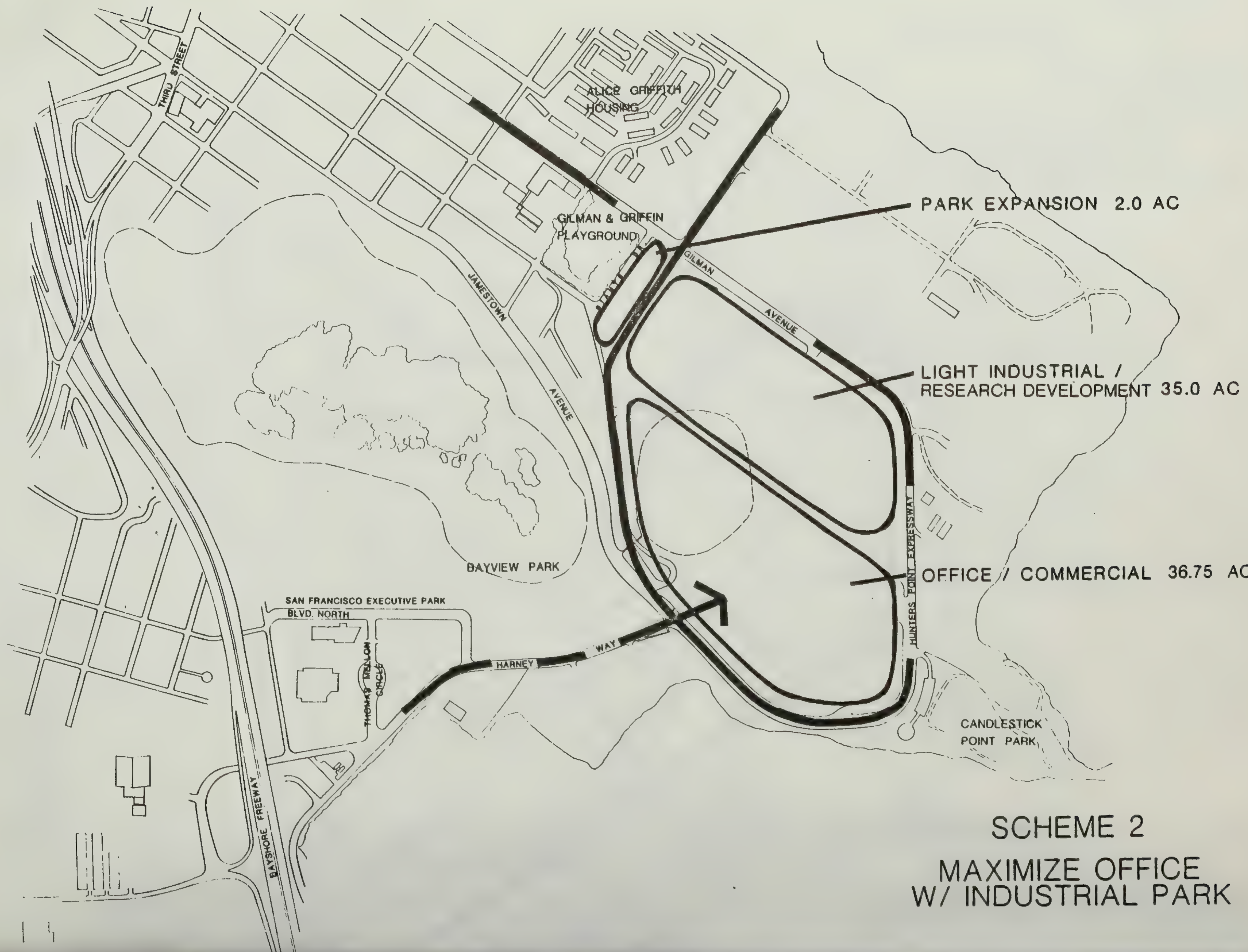
SCHEME NO	GROSS AREA	NET AREA (EXCLUDES PUBLIC STREETS)	PARKING AREAS	PARKING TOTALS
1. Housing	16 ac.	12.8 ac.	3.2 ac.	320 cars
Office	57.75 ac.	49 ac.	13.6 ac.	2500 cars
Reversion	4.25 ac.			
2. Light Industrial	35 ac.	29.7 ac.	4.5 ac.	560 cars
Office	36.75 ac.	31.25 ac.	8.7 ac.	1600 cars
Reversion	4.25 ac.			
3. Housing	52 ac.	42.7 ac.	25.6 ac.	3200 cars
Office/ Commercial	21.75 ac.	18.5 ac.	5.4 ac.	840 cars
Reversion	4.25 ac.			
4. Housing	11 ac.	8.8 ac.	1.8 ac.	220 cars
Office	18 ac.	15.3 ac.	5.6 ac.	780 cars
Light Industrial	44.75 ac.	38 ac.	5.8 ac.	725 cars
Reversion	4.25 ac.			
5. Stadium	16.5 ac.	16.5 ac.	31.0 at grade	4000 cars
			12.8 in structure	10,000 cars
Housing	5 ac.	5 ac.	(shared with stadium)	
Office/ Commercial	12.7 ac.	12.7 ac.	(shared with stadium)	
6. Stadium	18 ac.	18 ac.	60 ac.	8300 cars
7. Stadium	18 ac.	18 ac.	29.5 at grade	3800 cars
			12.8 in structure	10,000 cars
Housing	5 ac.	5 ac.	(shared with stadium)	
Office/ Commercial	12.7 ac.	12.7 ac.	(shared with stadium)	
8. Stadium	16.5 ac.	16.5 ac.	61.5 ac.	8000 cars



PLANNING FACTORS

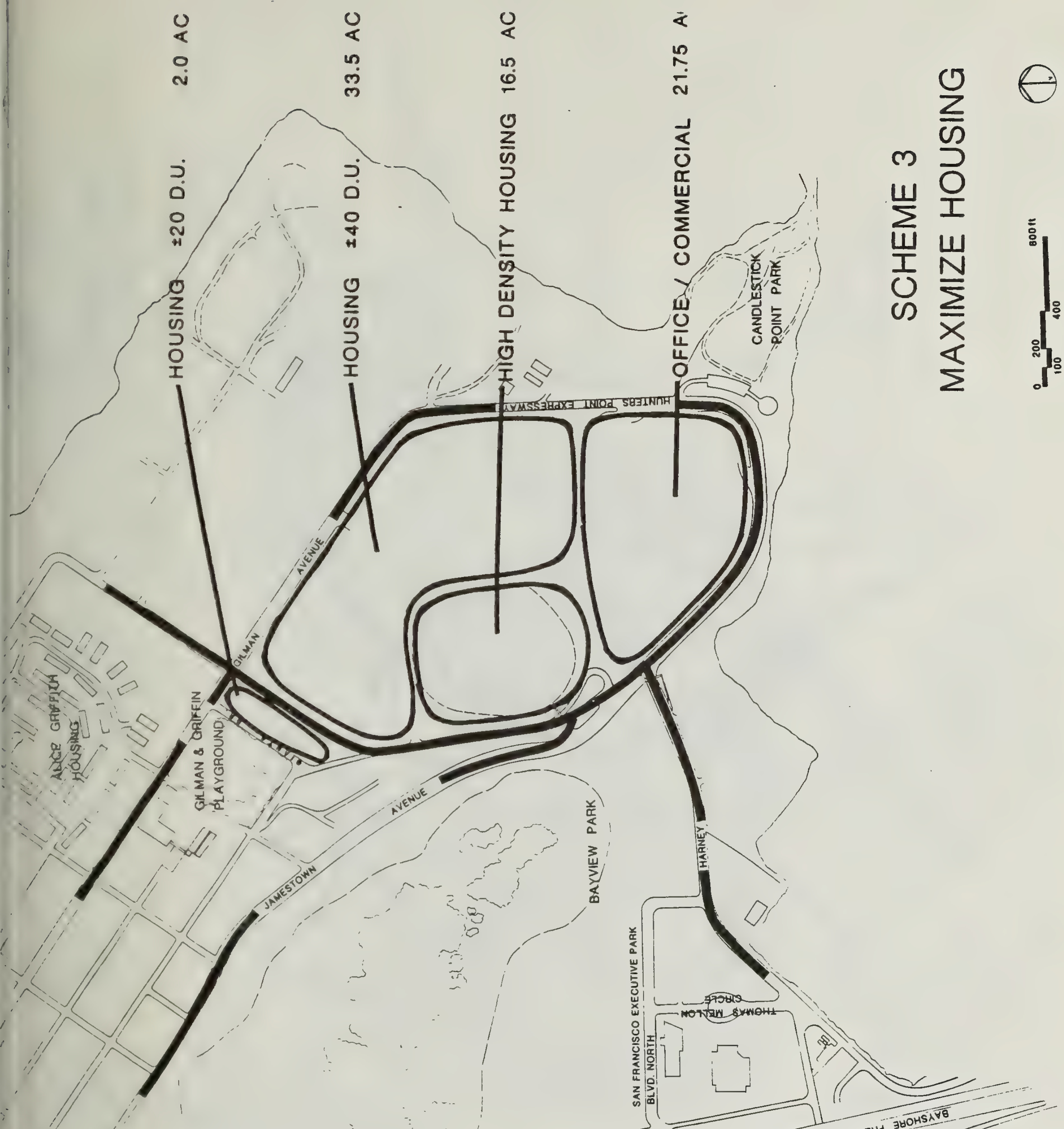


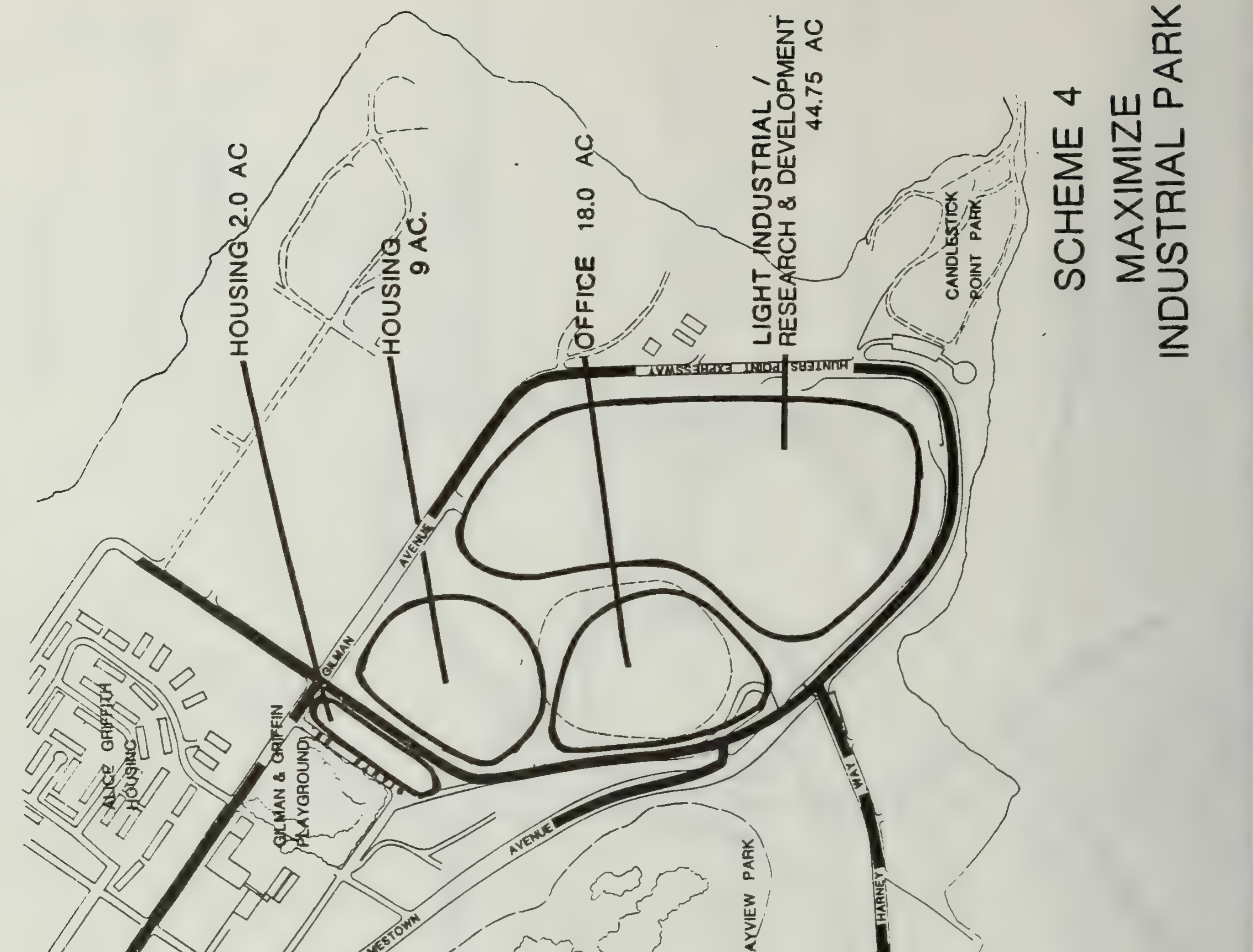
SCHEME 1
MAXIMIZE OFFICE

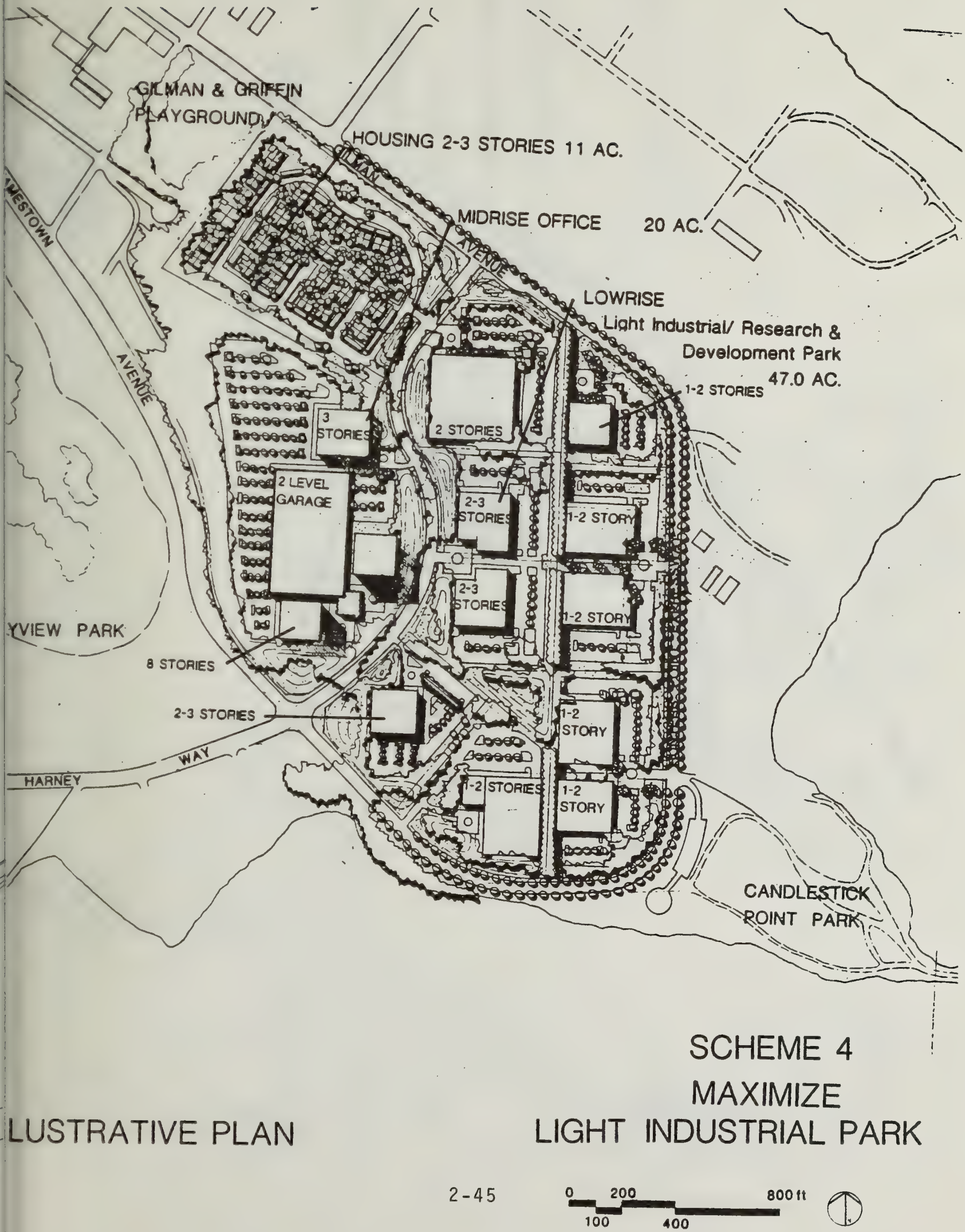


SCHEME 2

MAXIMIZE OFFICE
W/ INDUSTRIAL PARK

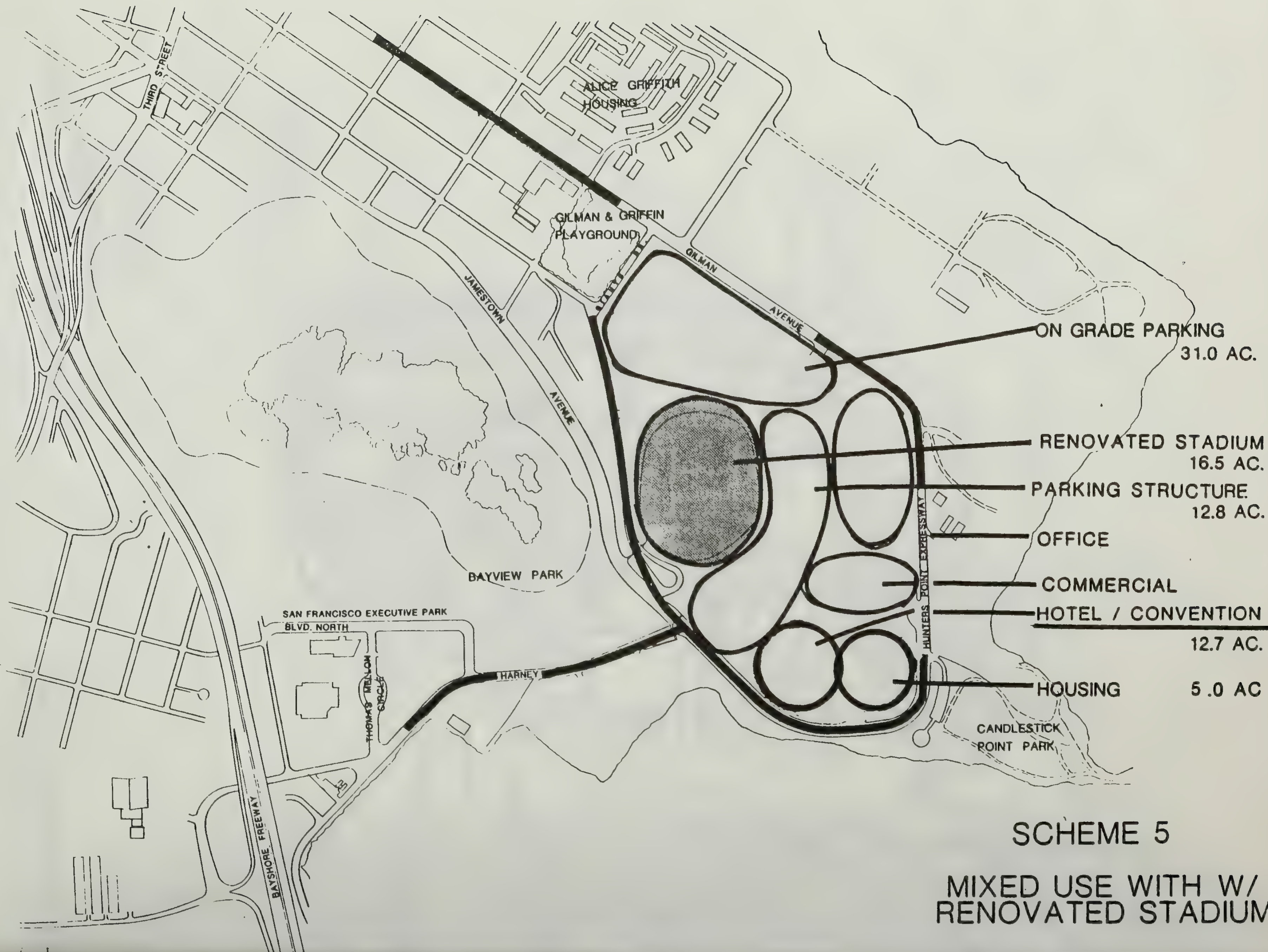

HOUSING ±20 D.U. 2.0 AC
HOUSING ±40 D.U. 33.5 AC
HIGH DENSITY HOUSING 16.5 AC
OFFICE / COMMERCIAL 21.75 A
SCHEME 3
MAXIMIZE HOUSING
0 100 200 400 800ft
CANDLESTICK POINT PARK
HUNTERS POINT EXPRESSWAY
GILMAN AVENUE
ALICE GRIFFITH HOUSING
GILMAN & GRIFFIN PLAYGROUND
JAMESTOWN AVENUE
BAYVIEW PARK
HARNEY
SAN FRANCISCO EXECUTIVE PARK
BLVD. NORTH
THOMAS MELLON CIRCLE
BAYSHORE FREEWAY
THIRD STREET


SCHEME 4
MAXIMIZE
INDUSTRIAL PARK
HOUSING 2.0 AC
HOUSING
9 AC.
OFFICE 18.0 AC
LIGHT INDUSTRIAL /
RESEARCH & DEVELOPMENT
44.75 AC
CANDLESTICK
POINT PARK
HUNTERS POINT EXPRESSWAY
GILMAN AVENUE
ALICE GRIFFITH
HOUSING
GILMAN & GRIFFIN
PLAYGROUND
JAMESTOWN AVENUE
BAYVIEW PARK
HARNEY WAY
SAN FRANCISCO EXECUTIVE PARK
BLVD. NORTH
THOMAS MELLON CIRCLE
BAYSHORE FREEWAY
THIRD STREET



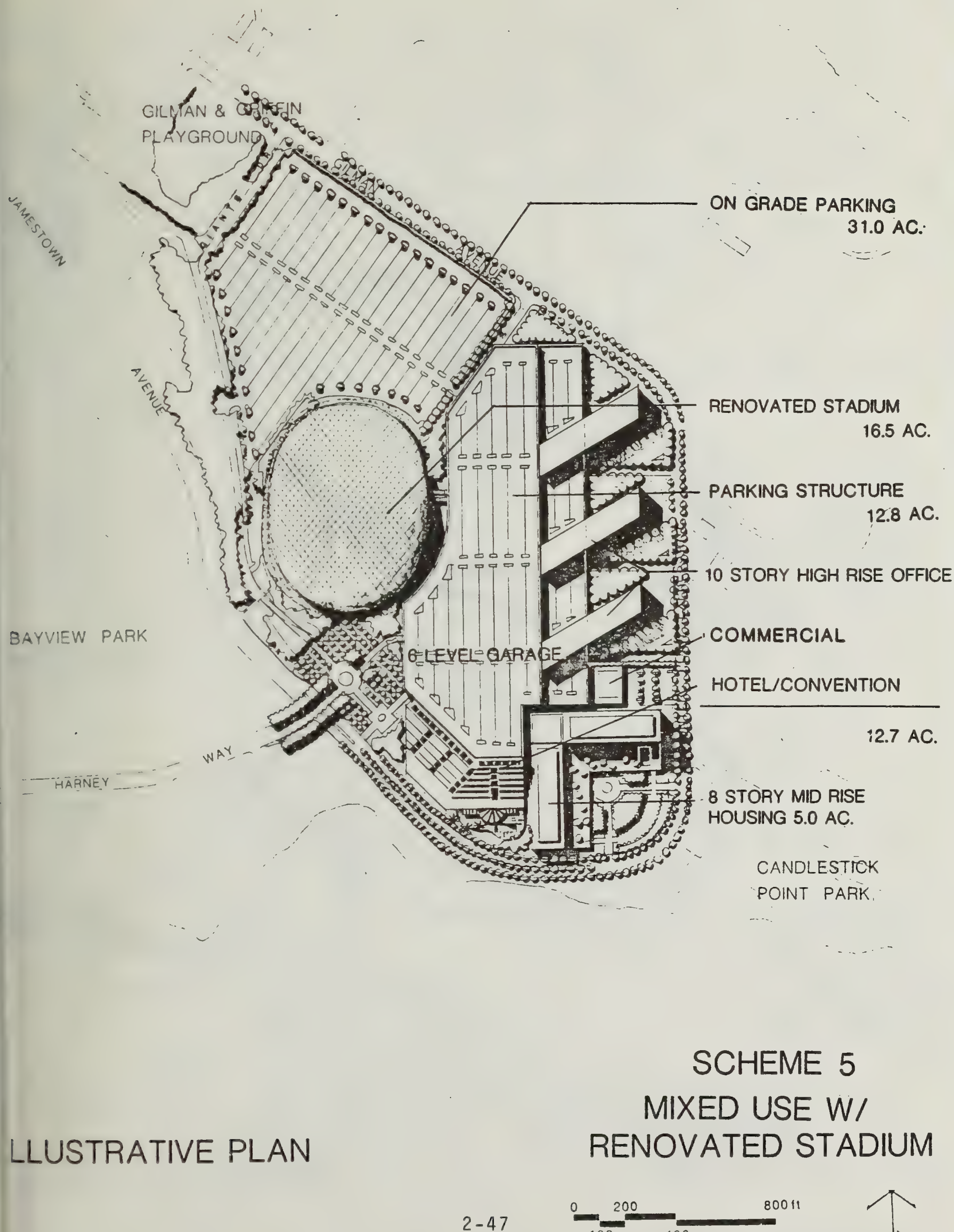
SCHEME 4
MAXIMIZE
LIGHT INDUSTRIAL PARK

LUSTRATIVE PLAN



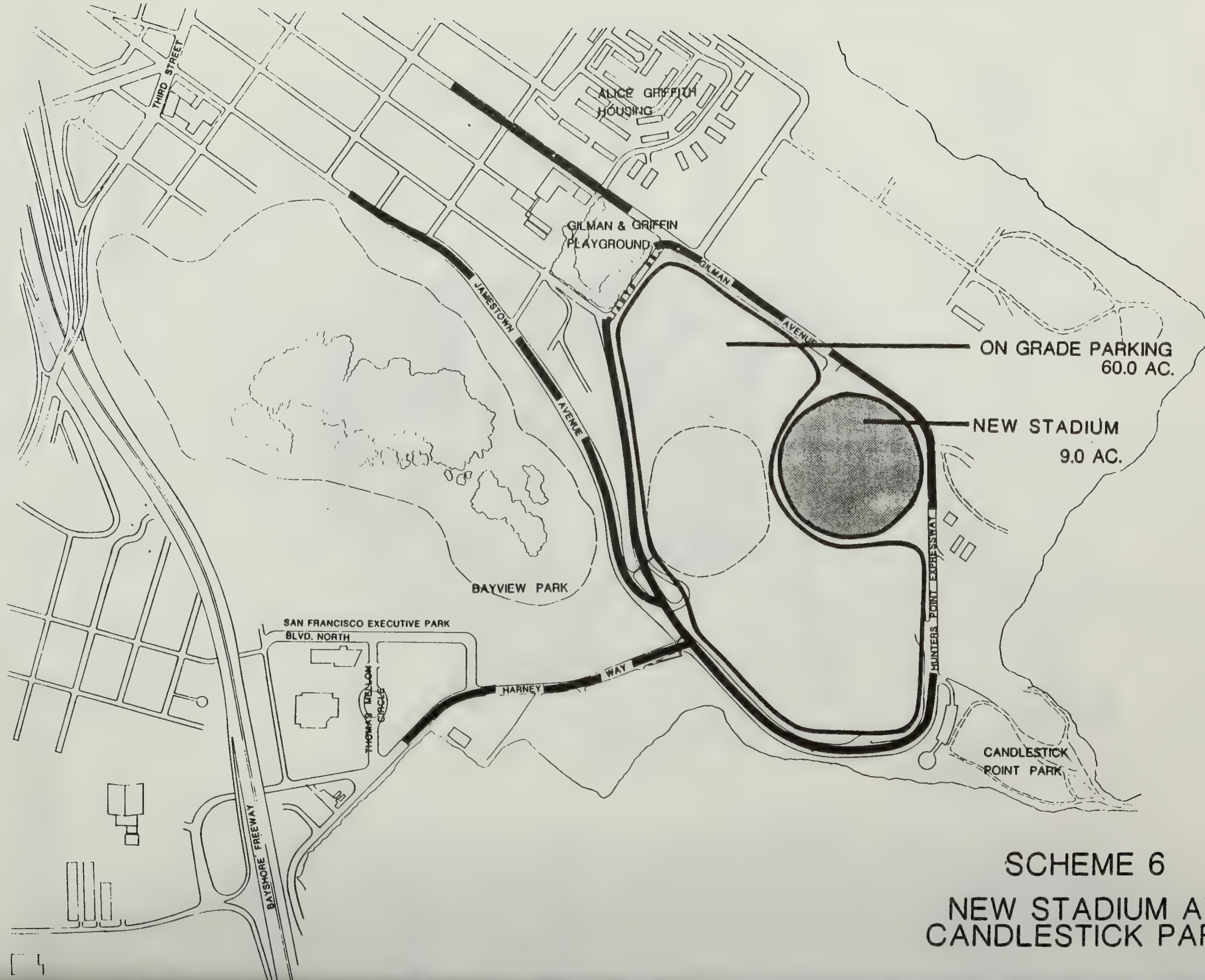
SCHEME 5

MIXED USE WITH W/
RENOVATED STADIUM



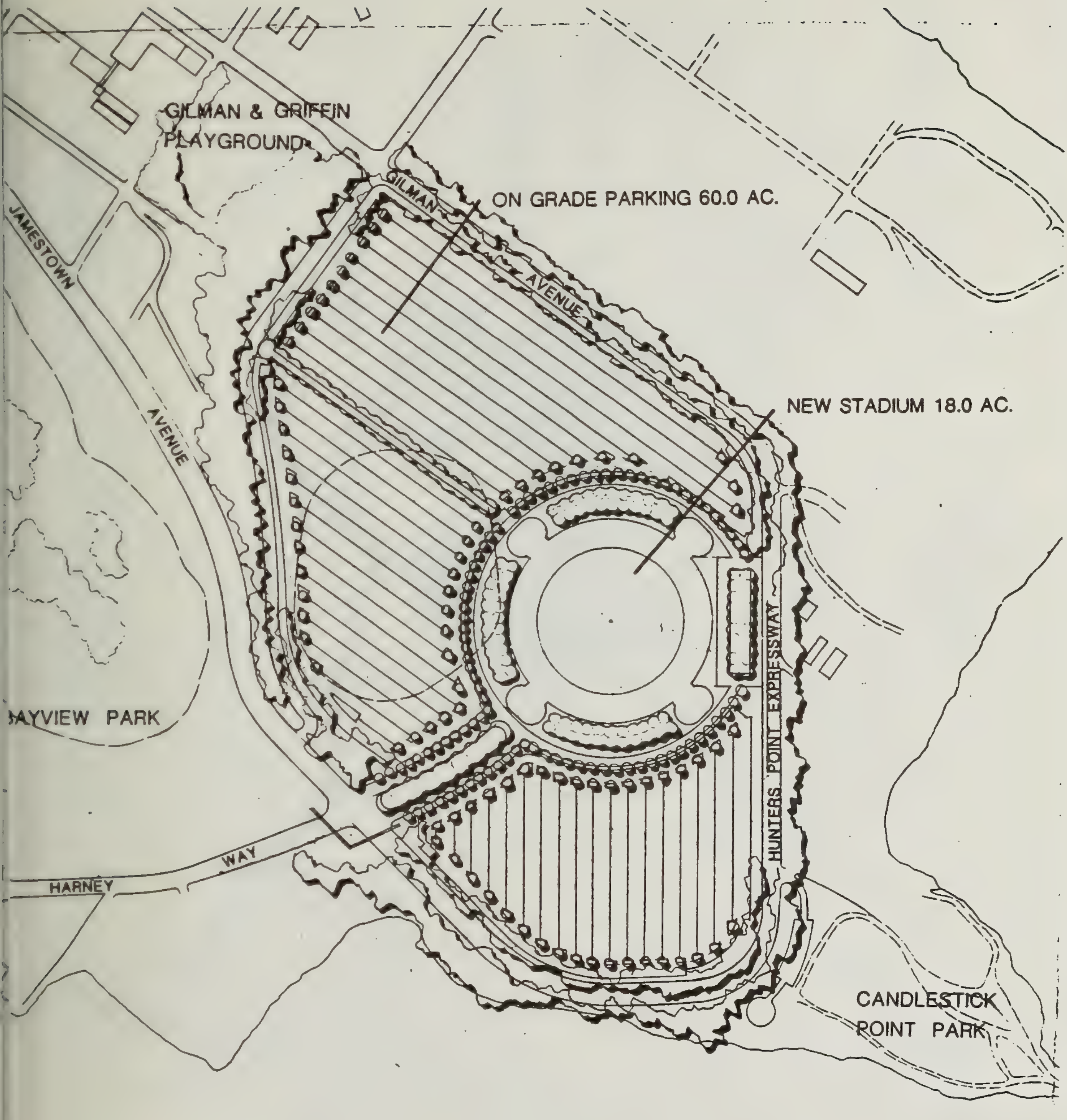
SCHEME 5
MIXED USE W/ RENOVATED STADIUM

LLUSTRATIVE PLAN



SCHEME 6

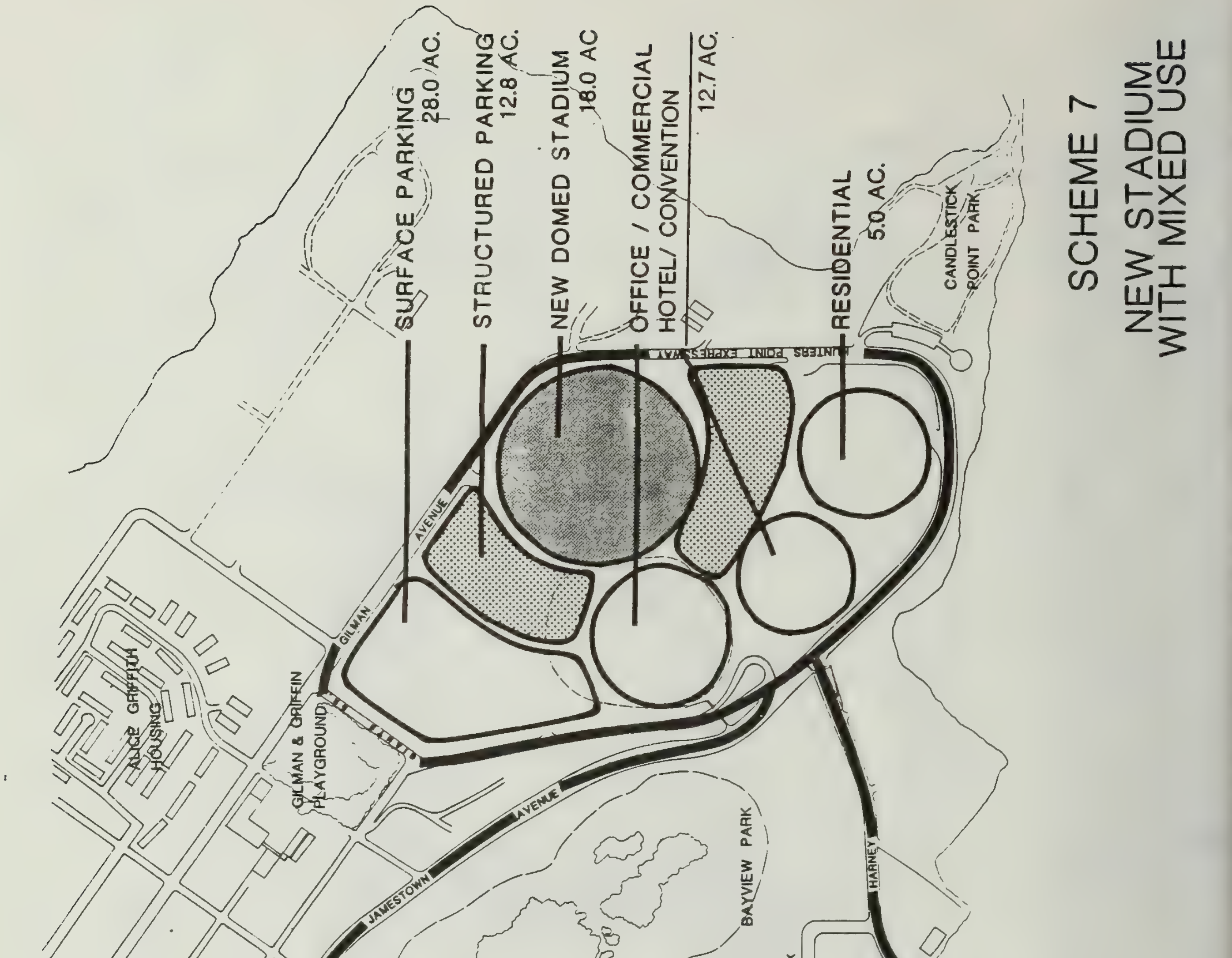
NEW STADIUM AT CANDLESTICK PARK



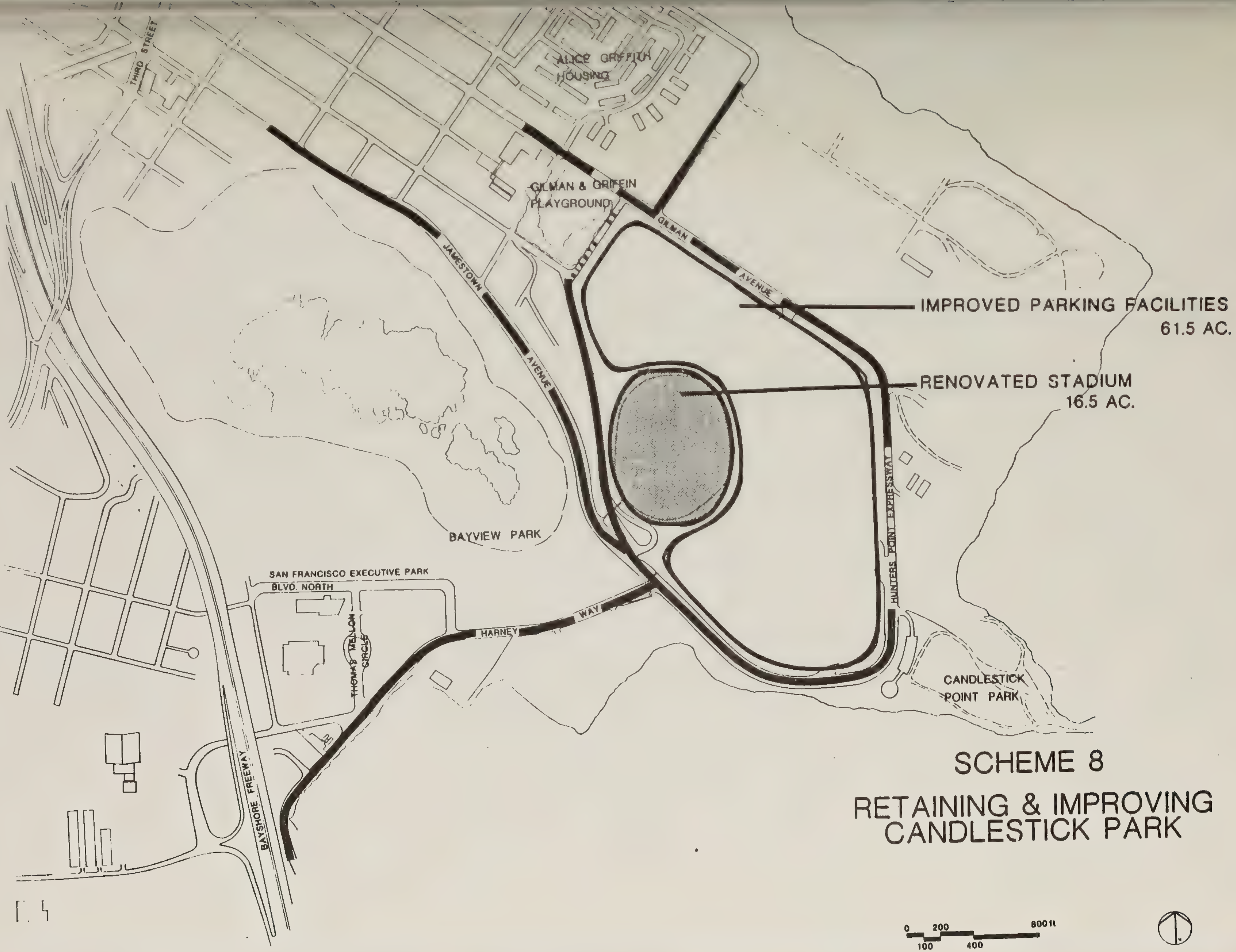
SCHEME 6

NEW STADIUM AT CANDLESTICK PARK

ILLUSTRATIVE PLAN



SCHEME 7
NEW STADIUM
WITH MIXED USE



SCHEME 8

RETAINING & IMPROVING CANDLESTICK PARK

3. BUILDING CONSTRUCTION COSTS

A. SCOPE

Barton-Malow and Williams & Burrows, as Joint Venture Construction Managers, have estimated the cost for upgrading Candlestick Park. Included in the estimate is the cost of constructing an air-supported teflon coated fabric roof, complete with all facilities and equipment required to enclose the stadium. During this upgrading, new facilities will be constructed and others refurbished to make the park more functional.

Inclusions

1. Eleven (11) new toilet rooms.
2. New and refurbished press facilities.
3. New studio and TV interview facility.
4. Refurbished administrative facilities
5. Expanded and refurbished team locker rooms.
6. New player medical facility.
7. Upgraded maintenance facility.
8. Air-supported teflon coated fabric roof with related structural modifications.
9. Complete stadium enclosure.
10. New synthetic turf playing surface.
11. Demolition of existing facility in applicable schemes.
12. Modified fire protection system.
13. New heating and ventilating system.
14. New electrical power distribution and lighting, new telephone system, new security system, new public address/sound system.
15. Twelve (12) new concession stands.

Exclusions

1. New scoreboard to be financed by outside sources with cost amortized through advertising revenue.
2. Concessionaire's equipment and furnishings.
3. Refurbishing Stadium Club and Forum Club.
4. Modification or upgrading existing parking.
5. Modifications of offsite utilities.

B. DATA

Barton-Malow and Williams & Burrows used the following data, assumptions, and documentation to prepare the estimate of cost.

1. Conceptual drawings provided by HNTB, CTMA, and Geiger-Berger.
2. Data from the "as-built" drawings of Candlestick Park.
3. Observations from onsite inspection.
4. The experience of Barton-Malow (10 year stadium/arena experience) and Williams & Burrows (50 year Bay Area Construction/Candlestick Park experience).
5. Data from other Study Team members.
6. All costs are based upon May, 1983 prices. Lee Saylor Inc. estimates current escalation at 3% per annum for 1983 and 7% to 9% per annum for 1984. The Candlestick Park estimate does not include escalation.
7. The quality of systems and materials priced is comparable to that used in other stadium projects developed by members of this study team.

C. ALTERNATIVES

1. Alternate No. 1 - Concept produced by study team.

2. Alternate No. 2 - Prior study produced by Barton-Malow Company (12/18/81).

D. ANALYSIS

1.0 Cost Estimate

1.1 Schemes 7 & 8, Alternate 1 (see Section A2 for description)

Based upon the current conceptual drawings produced by the Feasibility Study Team, we estimate covering, modifying, and refurbishing Candlestick Park would cost $57.1 million, at current cost. This structural scheme is based upon utilizing the existing structure with an added "ring" beam to support a new teflon coated fabric roof.

1.2 Schemes 7 & 8, Alternate 2 (see Section A2 for description)

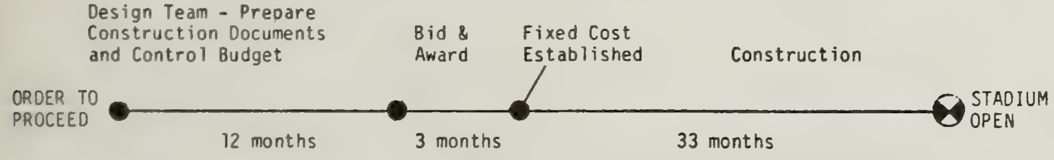
An alternate structural concept developed by Barton Malow in their study of December 18, 1981, utilizing a new exterior enclosure with air-supported, teflon coated fabric roof is estimated to cost $60.4 million, at current cost. This concept results in a facility comparable in function to that described in 1.1 above.

2.0 Construction/On-going Operation Interface

Our estimate includes funds to coordinate the work of various trade contractors to minimize impact on normal stadium operations. An "in depth" evaluation of actual impact is outside the scope of this study.

3.0 Schedule

A design/bid/build sequence of activities would dictate a forty eight (48) month schedule. This time would be allocated as shown below:



E. ELECTRICAL WORK DESCRIPTION

CANDLESTICK PARK RENOVATIONS

The electrical budget includes the following principal systems, all 100% new unless otherwise noted:

1. Primary Power Distribution System - Existing to remain with minor upgrading only.
2. Secondary Power Distribution System - 75% Replacement
25% Existing to remain
3. Emergency Power Distribution System
4. Motor Starters and Connections
5. Field Lighting System
6. Building Lighting System
7. Telephone Raceway System - 50% Replacement
50% Existing to remain
8. P.A. Sound System
9. Security System
10. Lightning Protection
11. T.V. Cable Tray System - Approximately 50% of new Stadium System
12. Fire Alarm System
13. Score Board Power Supplies - Upgrade of existing system
14. Temporary Lighting and Power System
15. Building Perimeter Lighting

E. MECHANICAL WORK DESCRIPTION

CANDLESTICK PARK RENOVATIONS

I. Plumbing:

1. Add plumbing fixtures for toilet rooms in areas presently used as concessions.

2. Rough-in only, for new concessions to be built around the outer edge of the concourses.

3. Add roof drainage system from new ring beam and extend to existing system.

4. Supply domestic cold water to all areas. Hot water to be provided when required with local electric heaters.

6. No changes to existing hot water system now serving locker area.

II. Heating, Ventilating and Air Conditioning:

1. Install twenty air supply fans systems (100 SR, 100,000 CFM) located on upper roof.

2. Install two pipe system to serve coils in ten of the air supply fan systems (ten units have no coils).

3. Install Three air cooled water chillers located at the roof of the stair towers (1000 ton total), with each connected into the two pipe system.

4. Add oil fired boiler capacity to raise total heating capacity to approximately 25,000,000 BTU/HR.

5. Provide ventilating systems for concessions, maintenance, lockers, and other lower level areas.

6. Provide a central panel for control of all major fan and cooler systems.

III. Fire Protection:

1. Provide a valved standpipe system serving all levels.

F. BUDGET ESTIMATE FOR CANDLESTICK PARK

DESCRIPTION	BUDGET
Modifications to Existing Structure	
- Remove Wind Baffles	380,000
- Remove Light Standards	27,000
- Structural Demolition	300,000
- Excavation & Backfill	115,000
- Caissons	240,000
- Concrete Structural Member	1,600,000
- Structural Steel Supports	1,450,000
- Steel Compression Ring	1,700,000
- Concrete Fill in Compression Ring	150,000
- Concrete Subgrade for Astroturf	900,000
- Concrete Deck Over Existing Ramps	900,000
- Concrete Fnd. for Ext. Closure	200,000
- Masonry Partitions	48,000
- Miscellaneous Iron	50,000
- Metal Roof Deck at Upper Roof	264,000
- Insulate Roof Fill at Lower Decks	135,000
- Roofing at Stadium Perimeter	248,000
- Roofing at Lower Decks	270,000
- Flashing and Gravel Stop	30,000
- Teflon Fabric Roof and Liner (2" Cables)	8,750,000
- Caulking and Sealants	60,000
- Revolving Doors	900,000
- Pressure Balance Doors	375,000
- Glass Exterior Walls	725,000
- Metal Exterior Walls	3,550,000
- Translucent Exterior Walls	4,166,000
- Curved Panel & Gutter	1,000,000
- Escalator Enclosures	600,000
- Graphics	250,000
- Trash Compactor	50,000
- Turn Styles	45,000
- Ticket Booths	15,000
- Astroturf	1,120,000
- Zamboni Maintenance Vehicle	125,000
- Movable Seats	300,000
- Painting	250,000

DESCRIPTION	BUDGET
- Elevator & Enclosure	120,000
- Plumbing, HVAC, Fire Protection	5,993,000
Roof Fan Supports & Covers	100,000
- Electrical	4,943,000
- Sound System	600,000
- Remove and Replace Fence, Paving, Trees	75,000
- New Public Toilets	220,000
- New Concession Stands	1,020,000
- Public Telephones by P.T.&T.	0
- Ticket Booths Rehab @ Gates A, E & F.	15,000
- Refurbish Event Security	42,000
- Refurbish Police Station	5,000
- Refurbish First Aid	12,000
- Refurbish Novelty Stands	10,000
- New Press Box	150,000
- Refurbish Football Press Box	315,000
- Refurbish Baseball Press Box	188,000
- Player Interview Area at Field Level	15,000
- New Studio Space at Promenade Level	10,000
- Renovate Baseball Admin.	375,000
- Renovate Football Admin.	150,000
- Renovate Ticket Sales	84,000
- Refurbish Football Lockers	90,000
- Refurbish Baseball Lockers	193,000
- Reburbish Visitor Lockers	98,000
- Refurbish Officials Lockers	5,000
- New Locker Room	432,000
- Field Toilet	10,000
- Team Photographers' Platform	10,000
- X-Ray Room	25,000
- Bank Locker Room	5,000
- Field Maintenance Storage	50,000

DESCRIPTION		BUDGET
Stadium Suites Options:		
- Modify Existing Boxes		
Eight Person (seating only)	20 ea X $10,000 =	$200,000
Eight Person Suites	28 ea X 25,000 =	700,000
Twelve Person Suites	13 ea X 35,000 =	455,000
Twenty-four Person Suites	2 ea X 70,000 =	140,000
- Extend Boxes from Column Lines 48 to 60		
Eight Person Suites	16 ea X 35,000 =	560,000
- Relocate Scoreboard and Extend Boxes from Column Lines 60 to 71		
Twelve Person Suites	30 ea X 60,000 =	1,800,000
- New Boxes, Elevators and Stair Towers at Perimeter at Upper Deck		
Eight Person Suites	78 ea X 50,000 =	3,900,000 *
Twelve Person Suites	78 ea X 70,000 =	5,460,000 *

Subtotal	$	50,503,000
Contingency (7%)		3,535,200
Subtotal		54,038,200
General Conditions (5 3/4%)		3,107,200
Total	$	57,145,400 **

* Excluded from Total Price
** Budgeted Construction Administration Fee Not Included

G.

BARTON MALOW BUDGET ESTIMATE

CANDLESTICK PARK (ALTERNATIVE 2)

BUDGET - 12/18/81	$ 44,756,000
DEDUCT CONTINGENCY	(1,000,000)
ADD FOR RENOVATIONS & IMPROVEMENTS	5,775,000
ADD FOR STADIUM SUITES	3,855,000
SUBTOTAL	53,386,000
CONTINGENCY 7%	3,737,000
SUBTOTAL	57,123,000
GENERAL CONDITIONS 5 3/4%	3,285,000
TOTAL	$ 60,408,000 *

* Budgeted Construction Administration Fee Not Included

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WALNUT CREEK, CALIFORNIA 94596

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L A 213-937-8181

COST ESTIMATE REVIEW AND ANALYSIS

OBJECTIVE:

To review and analyze cost estimates prepared by Williams and Burrows and Barton Malow for alternative schemes and studies concerning the Sports Stadium for City of San Francisco. The purpose of the review was to assess the unit costs used in these estimates for their reasonableness, consistency and authenticity.

PROCEDURES:

The procedures followed were:

1. Review the unit costs used in relationship to the quantities shown.

2. Check the quantities against the drawings for those items where the quantities would be large enough to have a significant impact on the total cost.

3. Check the estimates for continuity of price and quantity. For example:

    a) Metal deck quantity to concrete fill

    b) Foundation excavation to foundation concrete

    c) The same prices for the same work

4. Check quantities and ratios.

    a) Lbs. rebar to CY concrete

    b) Lbs. steel to sq. ft. of surface area

    c) Cu. yds. concrete to sq. ft. of surface area

5. Check composite costs for their relationship to established parameters.

6. Prepare schedule of questionable items for review by the study team.

COST ESTIMATE REVIEW AND ANALYSIS - Cont'd

7. Check estimates and plans for omissions to be sure that in the course of summarizing and quantifying the various alternates, that a significant work item was not overlooked.

In the preparation of the variance schedule those items that met the criteria of reasonableness were not listed although they had been reviewed in the manner described in the Procedure Section. Also, those items that were questioned, but the variance value was not significant, were not scheduled. It was decided that for the purpose of this review, only variance values above $15,000 would be scheduled.

Since the questioned items occur in more than one estimate, it was felt that scheduling each estimate independently would be redundant. It was decided that the questionable items occurring in the basic estimates (Alt. #1 Candlestick and Alt. #1 Downtown Stadium) would be adequate and that all other estimates could be adjusted from these items.

Exhibit "A" is a Revised Construction Cost Summary reflecting the variances recommended.

Estimate - Barton-Malow/Alternate 2 - Candlestick was not supported by worksheets to review. This total was not revised.

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ESCALATION

The assumption throughout the review was that all costs on the estimate were current and no provisions were included for escalation.

Although it is felt that it will not be in the 11 to 12 percent range that was experienced in 1979, 1980 and 1981, inflation will be experienced in each of the coming years. The unstable nature of the present economy and the uncertainty of the future years makes the projection of building cost escalation very difficult. Following is our projection for the upcoming years:

If project commences:

6/1/84 Add 5.3% to Project Cost

6/1/75 Add 12.3% to Project Cost

6/1/86 Add 19.3% to Project Cost

6/1/87 Add 26.3% to Project Cost

EXHIBIT "B"

SPORTS STADIUM STUDY
LSI #8329n
ALT. 1 - BUDGET ESTIMATE - CANDLESTICK
Williams & Burrows

PAGE #	ITEM #	DESCRIPTION	PRICE SHOWN	LSI PRICE	DIFFERENCE	VARIANCE SCHEDULE
1	#6	Remove concrete wall.	2.00	4.00	+34,000	$2.00 price only acceptable if based on wrecking ball or dozer push over type demo - Georgia Buggy production equal to $165.00 PCY - combo of both equals 4.00 sf.
1	#14	Remove top portion of press box.	15.00	5.00	-30,000	Assume 6 man crew working by hand 15.00 psf would allow 4 1/2 weeks this excessive for quantity involved.
1	#16	Remove fence, planter, trees, etc. for crane access.	25,000LS			Appears excessively high allowance for this scope. If area for access required 100 LF of frontage, $10,000 would seem adequate.
4	#7	Backfill hand	30.00	20.00		General Observation: Hand rates backfill appear high in comparison w/industry production averages.
5	#8	Forms 1/side braced.	7.50	4.66	15,052	Price exceeds Indust Ave. - check of ratio per CY of ftgs. confirmed lower price. (Note see item #18 page 5).
5	#13	Shearwall forms.	6.00	4.40	70,840	Figuring 3 uses, the 4.40 per SFCA is adequate.
6&7	ALL	Reinforcing steel.			61,200	LBS of rebar per CY of concrete exceeds norm by more than 50% W&B quantity 194 tons LSI ----- 117.5 ton.
Various		Structrual Excavation Structural Backfill				Diff. prices used. Sometimes 8.00&12.00 At other times, 10.00 & 14.00. It seems that 8.00 & 12.00 unit costs are best.

EXHIBIT "B"

SPORTS STADIUM STUDY
LSI #8329n
ALT. 1 - BUDGET ESTIMATE - CANDLESTICK
Williams & Burrows

PAGE #	ITEM #	DESCRIPTION	PRICE SHOWN	LSI PRICE	DIFFERENCE	VARIANCE SCHEDULE
12	#1	Structural Steel Framing	1,400	1,100	288,000	Structural steel framing in SF area is currently going for 900 to 1100.00 per ton.
12	#17	Steel Ring Beam	1,400	1,100	360,000	Plate steel welded in this quantity should not exceed 1100.00 per ton.
13	#1	Metal Deck - Upper Roof	4.00	1.80	145,200	Unless extreme conditions require a special decking a 3" standard rib 20 ga deck should suffice.
13	#6	Trocal Roofing	4.00	1.50	155,000	Roofing prices have been varying but current quotes have not exceeded LSI price in any instance.
13	#7	Built-Up Roofing	3.00	1.50	135,000	Even at highest quotes for 5-ply, the 1.50 price should be adequate.
14	#2&5	Translucent Panels	35/40.00	17/20.00	2,122,000	Quotes obtained from curtain wall supplier indicate that translucent panels cost no more than metal.
14	#17	Escalators	1,000	3,000	(1,200,000)	Not able to confirm prices of single run escalator. Prices in records for floor to floor installations were in $3,000 per LF area.

4. TRAFFIC/TRANSPORTATION/PARKING

A. SCOPE - CANDLESTICK PARK

The scope of this task is to a) estimate the traffic, parking and transit impacts of a range of Candlestick Park alternatives, and b) to identify and estimate the costs of needed transportation improvements for these alternatives. Based on this evaluation, a relative comparison of the transportation implications of the Candlestick Park alternatives was prepared.

B. DATA

The data used in the analysis of Candlestick Park alternatives was derived from a number of background sources including existing reports, field observation, and direct interviews with City and state agency staff and the current operator of parking facilities at Candlestick. The sources used are listed below.

Reports:

1. City and County of San Francisco Department of Public Works, Report on Candlestick Park Access, October 1981.

2. Southern Pacific Development Company, Proposed Specific Plan for Bayshore Office Park and Baylands Development Area, Brisbane, California, July 1982.

3. State Department of Parks and Recreation, Candlestick Point State Recreation Area, Resource Management Plan, General Development Plan, Environmental Impact Report, June 1979.

4. Institute of Transportation Engineers, Trip Generation, An Informational Report, Second Edition, 1979.

Interviews:

1. Norman Bray and Scott Schoaf, Department of Public Works, Traffic Division, April 7, 1983.

2. Larry Froley, Ranger, State Department of Parks and Recreation, Candlestick Point State Recreation Area, telephone conversations, March 1, 1983.

3. Robert Jarling, Deputy District Director for Planning, California Department of Transportation, April 20, 1983.

4. Nicholas Leonoudakis, President, Fineway Parking Company, Candlestick Park Concession, April 7, 1983.

5. Carol Nelson, State Department of Parks and Recreation, Candlestick Point State Recreation Area, telephone conversations, April 8, 1983.

6. Charles Romeyn, Scheduling Department, San Francisco Municipal Railway, telephone conversations, April 1983.

7. Ernie Satow, Senior Transportation Engineer, California Department of Transportation, Project Development Division, April 20, 1983.

8. Scott Schoaf, Department of Public Works, Traffic Division, telephone conversations, April 1, 1983.

Other Sources:

1. Environmental Science Associates, Executive Park Employee Travel Survey, 1982.

C. ALTERNATIVES

Five alternatives for Candlestick Park have been analyzed, as described below.

Alternative 4: Maximize Industrial Use

This alternative would replace the existing Candlestick Park facility with a light industrial park which includes some adjoining housing and office uses. The program of proposed uses is listed below.

Use	Acres	FAR/Density	Square Footage/Units
Light industrial/ high technology	44.75	3.0	±584,800 sq.ft. (50% office/50% warehouse)
Office	18 ac.	5.0	±392,000 sq.ft. mid-rise office with 25% covered parking
Housing	11	20 du/acre	220 units
Total	73.75 acres		

Alternative 5: Mixed Use With Renovated Stadium

This alternative would renovate (dome) Candlestick Park with mixed uses including office, housing, hotel/convention, and retail facilities built around the stadium. No additional seats would be added to the stadium. A large parking structure would also be constructed on the existing main parking lot.

Use	Acres	FAR/Density	Square Footage/Units
Highrise Housing with Structured Parking	5	100 du/acre	500 units
Domed Stadium	17.5		
Hotel/Convention	(1)	400 rooms	250,000 sq.ft.
Office	(1)		±1,000,000 sq.ft.
Retail/Restaurants	(1)		50,000 sq.ft.
Parking			10,000 spaces (structure) 4,000 on grade 1,000 off site
Total	45 acres		

Alternative 6: New Stadium

This alternative would replace the existing Candlestick Park facility with a new +70,000 seat domed stadium facility.

Alternative 7: New Stadium With Mixed Use

This alternative would combine the new stadium proposed in Alternative 6 with the same mixed uses proposed in Alternative 5.

Alternative 8: Renovated Stadium

This alternative would renovate (dome) the existing facility. No additional seating capacity or uses would be provided.

(1) Office/retail, hotel/convention, and central parking structure will be located on 22.5 acres.

The following analysis describes existing and predicted future conditions first as a basis for understanding the transportation implications of each of the alternatives, which are discussed in the end of this section.

Existing Conditions

1. Freeway Access and Capacity

   The Candlestick Park site is located east of U.S. Highway 101. Direct pre-game access is provided via Harney Way from northbound 101, and via Alana Way from southbound 101. Indirect access to the Park is provided from southbound Highway 101 via Silver Avenue, Paul Avenue and Bayshore Boulevard. The regional location of the site is shown in Figure 1.

   In 1980, twenty-four hour traffic volumes on U.S. 101 at Candlestick Park (average month) were 144,000, with peak hour volumes estimated at 7,100 vehicles in the southbound direction in the P.M. peak, and 6,600 vehicles northbound in the A.M. peak. The estimated hourly capacity of this segment of U.S. 101 is 14,400 vehicles in both directions, or 7,200 vehicles northbound and 7,200 vehicles southbound. U.S. 101 at Candlestick Park (at Alana and Harney Ways) is currently functioning at 90 percent of capacity in the P.M. peak hour in the southbound direction (Level of Service E) and 92 percent of capacity (also Level of Service E) in the A.M. peak hour in the northbound direction.[1]

   Pre-game and post-game access routes are shown in Figures 2 and 3. Vehicles utilize local surface streets (discussed in the next section) to obtain southbound U.S. 101 access from Alana Way and Third Street on-ramps and northbound U.S. 101 access from Harney Way and Silver Avenue on-ramps.

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(1) Environmental Science Associates, Executive Park Employee Travel Survey, 1982.

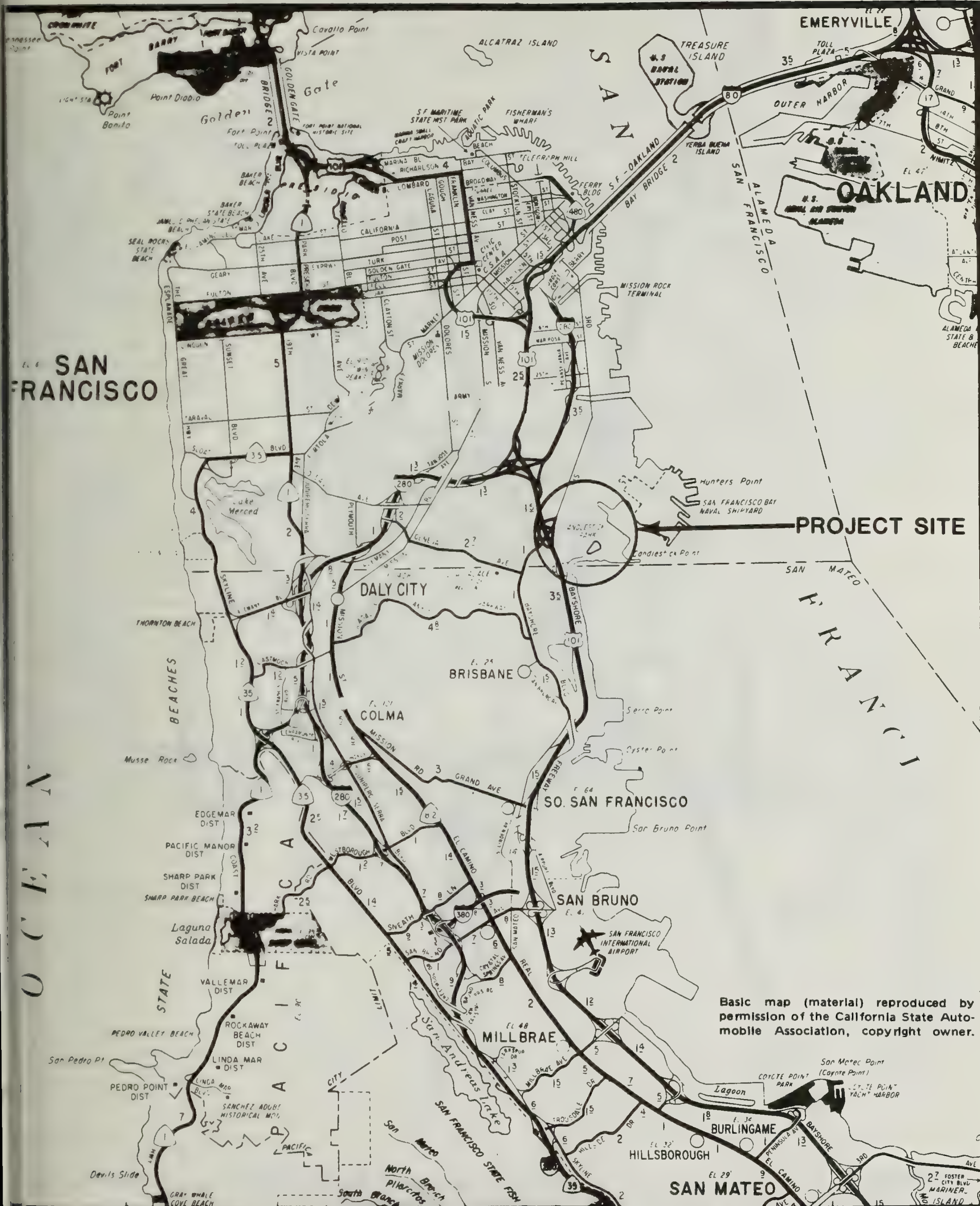

FIGURE 1

REGIONAL SETTING

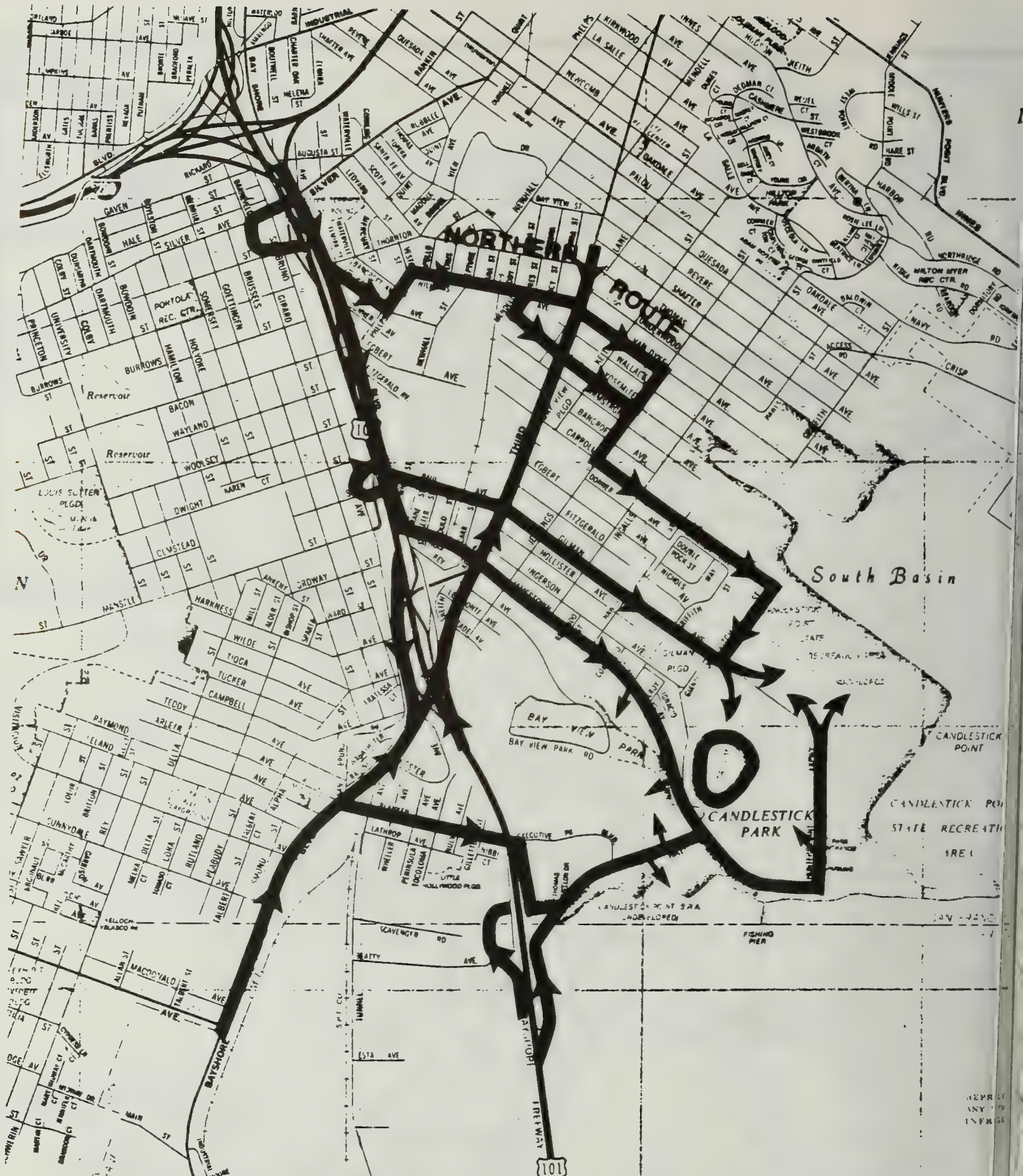

FIGURE 2

CANDLESTICK PARK PRE GAME INGRESS ROUTES

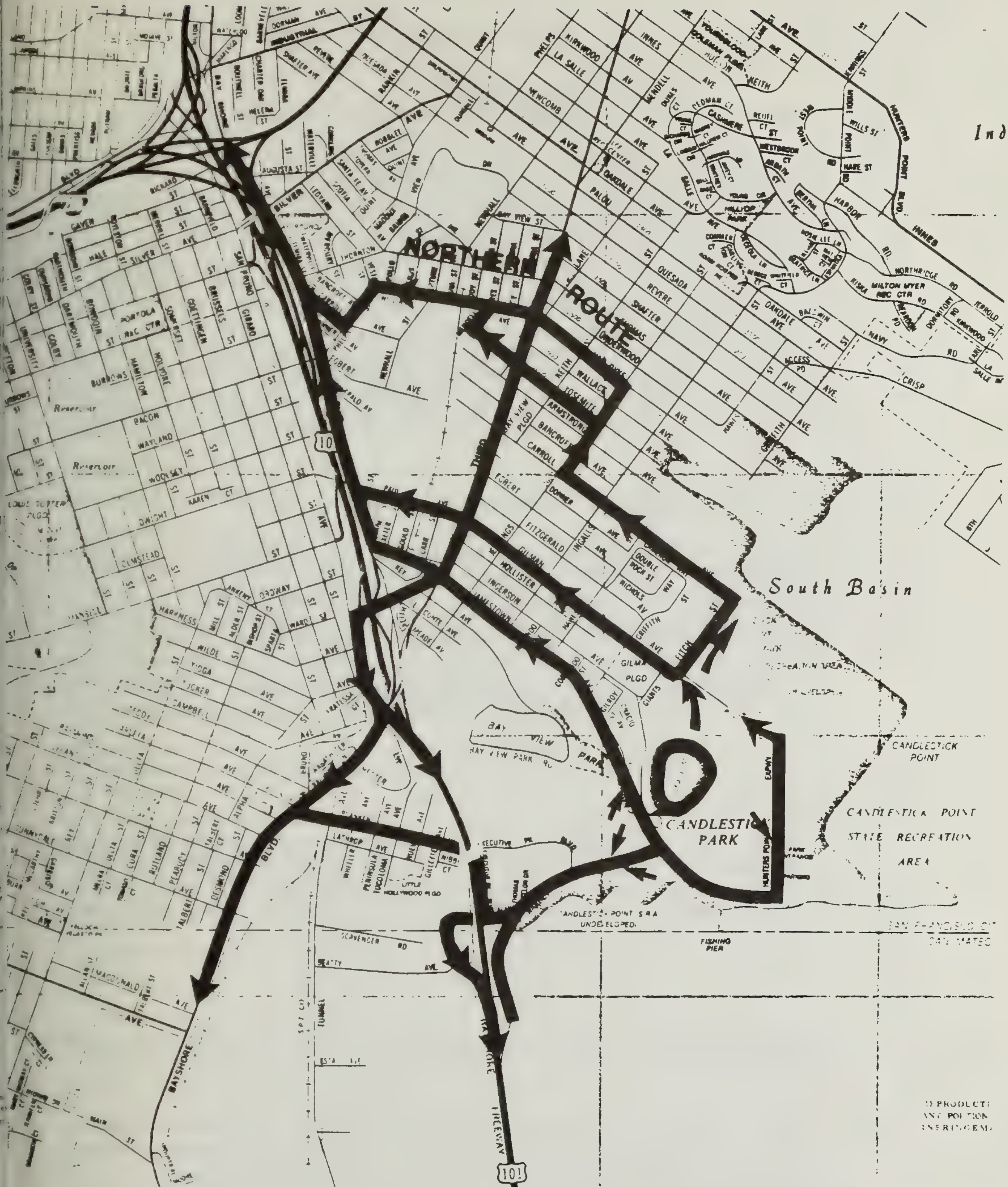

FIGURE 3

ANDLESTICK PARK POST GAME EGRESS ROUTES

"Map copyrighted 1983 by the California
State Automobile Association. Reproduced by permission."

2. Street System Access and Capacity

As shown in Figure 2, vehicle access to the stadium from the south is via Harney Way from U.S. 101. From the north, the major access corridors are via the major arterials, Bayshore Boulevard and Third Street, and via local collector streets such as Paul Avenue, Gilman Avenue, Williams Avenue, Carroll Avenue, and Jamestown Avenue. (Figures 2 and 3). During non-game days, the Levels of Service along these roadways are high (LOS B or better).(1) A detailed description of Levels of Service is provided in Appendix C.(2) Levels of Service deteriorate significantly during pre-game and post-game periods. The local streets in particular are subject to extensive traffic and parking congestion, and parking restrictions (see section on Traffic and Neighborhood Impacts).

3. Origin/Destination Patterns

Origin and destination patterns of stadium patrons are related to the type of sporting event. Tables 1 and 2 provide a breakdown of current origins and destinations by event and major corridor route. The baseball origin/destination results show that baseball games draw primarily from San Francisco compared to football games (34 percent versus 27 percent). Football games tend to draw slightly more patrons from the Peninsula than baseball (47% versus 43%).

4. Mode Split

The private automobile is the primary mode of travel to and from Candlestick Park for virtually all sporting events. The private auto is used by 80 percent or more of persons travelling to all games. The mode split for each major sporting event is shown below:

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(1) Environmental Science Associates, Executive Park Employee Travel Survey, 1982.

(2) Level of Service is a broad measure of the effect of a number of traffic flow factors such as traffic volume, speed, traffic conflicts, or traffic controls on a given roadway or intersection. Higher levels of service (A or B) are generaly associated with lower traffic volumes, better traffic flow.

TABLE 1: FOOTBALL ORIGINS/DESTINATIONS

MAJOR CORRIDOR ROUTES	ORIGINS/DESTINATIONS				
	SF	SM/SC	A/CC	M/S/NO	TOTALS
U.S.101 SO		37.1%	5.7%		42.8%
BAYSHORE SO	1.9%	7.5%			9.4%
I-280 W	3.8%	2.5%			6.3%
U.S.101 NO	7.5%		8.2%	4.4%	20.1%
BAYSHORE NO	5.0%				5.0%
THIRD ST. NO	8.8%		4.7%	2.9%	16.4%
TOTALS	27 %	47.1%	18.6%	7.3%	100 %

TABLE 2: BASEBALL ORIGINS/DESTINATIONS

MAJOR CORRIDOR ROUTES	ORIGINS/DESTINATIONS				
	SF	SM/SC	A/CC	M/S/NO	TOTALS
U.S.101 SO		33.9%	3.6%		37.5%
BAYSHORE SO	2.4%	6.8%			9.2%
I-280 W	4.8%	2.3%			7.1%
U.S.101 NO	9.4%		5.1%	7.0%	21.5%
BAYSHORE NO	6.3%				6.3%
THIRD ST. NO	11.0%		2.9%	4.6%	18.5%
TOTALS	33.8%	43 %	11.6%	11.6%	100 %

Source: City and County of San Francisco, Department of Public Works, Traffic Division, Report on Candlestick Park Access, 1981.

- o Weekday Baseball: Muni 14%, Charter 5%, Auto 81%
- o Weeknight Baseball: Muni 9%, Charter 4%, Auto 87%
- o Weekend Baseball: Muni 9%, Charter 6%, Auto 85%
- o Weekend Football: Muni 8%, Charter 8%, Auto 84%

For peak attendance events, an average transit mode split of 16 percent is commonly accepted, with Muni and charter buses constituting an equal share of 8 percent.(1)

5. Parking Supply

Parking supplies available in April 1983 are summarized in Tables 3 and 4 and shown in Figure 4. Total parking supply consists of 16,218 off-street spaces (not including 220 bus spaces in the main lot), and 650 on-street spaces, to form a total supply of 16,868 spaces. Of this total, 7,213 are located in the main lot. The remaining 9,655 spaces are located in perimeter lots owned by the State of California, in private lots, and along surrounding neighborhood streets. Virtually all of the off-street spaces (94 percent) are within one-half mile walking distance of the stadium (see Areas A, B, C, D, E, and F of Figure 4). The remaining 6 percent is located less than three-quarters of a mile away.

6. Parking Demand

Table 5 shows estimated parking demand for various sizes of baseball and football events. Demand for parking fluctuates both above and below these estimates depending on transit usage and vehicle occupancy for each specific game. For a capacity weekend football event of 61,000 people, parking demand can be as high as 16,400 vehicles.

7. Comparison of Existing Parking Supply and Demand

A comparison of existing parking supply and demand indicates that existing supply (16,868 spaces) is sufficient to accommodate demand (16,400 vehicles) associated with a capacity football crowd of 61,000 people. However, the possibility exists that some of the existing off-site parking supply may be displaced by development in surrounding areas, creating a future parking deficit (see Section Future on Conditions).

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(1) City and County of San Francisco, Department of Public Works, Report on Candlestick Park Access, October 1981.

TABLE 3

EXISTING OFF STREET PARKING SUPPLY

LOCATION	EXISTING SPACES (1983)	COMMENTS
A. Main Lot	7,213	Paved lot, does not include 220 bus space
B. North of Gilman Avenue	4,400	Includes 3,200 unpaved spaces leased by private operator from the State of California, and 1,200 unpaved spaces leased from private owner.
C. West of Fitch Street	725	Includes 350 unpaved spaces leased by private operator from the State, and 375 spaces owned by the City of San Francisco Housing Authority.
D. South of Harney Way	1,300	Unpaved, leased by private operator from the State, within State Recreation Area boundary.
E. North of Harney Way	400	Unpaved, leased by private operator from the State of California
F. South of Jamestown Avenue	1,300	Unpaved, leased by private operator from the State of California
G. Executive Park Office Complex	800	Includes 350 paved spaces (uncontrolled nights, weekends, and holidays) and 450 unpaved spaces.*
H. East of Harney Way	80	Unpaved, leased by private operator from the State of California
TOTAL OFF STREET PARKING SPACES	16,218**	

Source: Nicholas Leonoudakis, President, ABLE Parking Company, Candlestick Park, personal interview, April 7, 1983.

*Does not include 400 spaces expected in Fall of 1983.

**Does not include 600 space overflow lot south of Beatty Avenue available in Fall 1983.

TABLE 4

EXISTING ON STREET PARKING SUPPLY

WALKING DISTANCE FROM STADIUM	NUMBER OF PARKING SPACES
0 to 1/4 mile	0
1/4 to 1/2 mile	131
1/2 to 3/4 mile	425
3/4 to 1 mile	643

TABLE 5: ESTIMATED PARKING DEMAND

EVENT SIZE	BASEBALL GAMES			FOOTBALL WEEKEND
	WEEKDAY	WEEKNIGHT	WEEKEND	
5,000	1,500	1,850		
15,000	4,650	5,650	5,300	
25,000	8,000	8,350	8,200	
35,000		11,050	10,600	
45,000		13,400	12,900	12,700
55,000			15,300	14,800
61,000				16,400

Source: City and County of San Francisco, Department of Public Works, Traffic Division, Report on Candlestick Park Access, 1981.

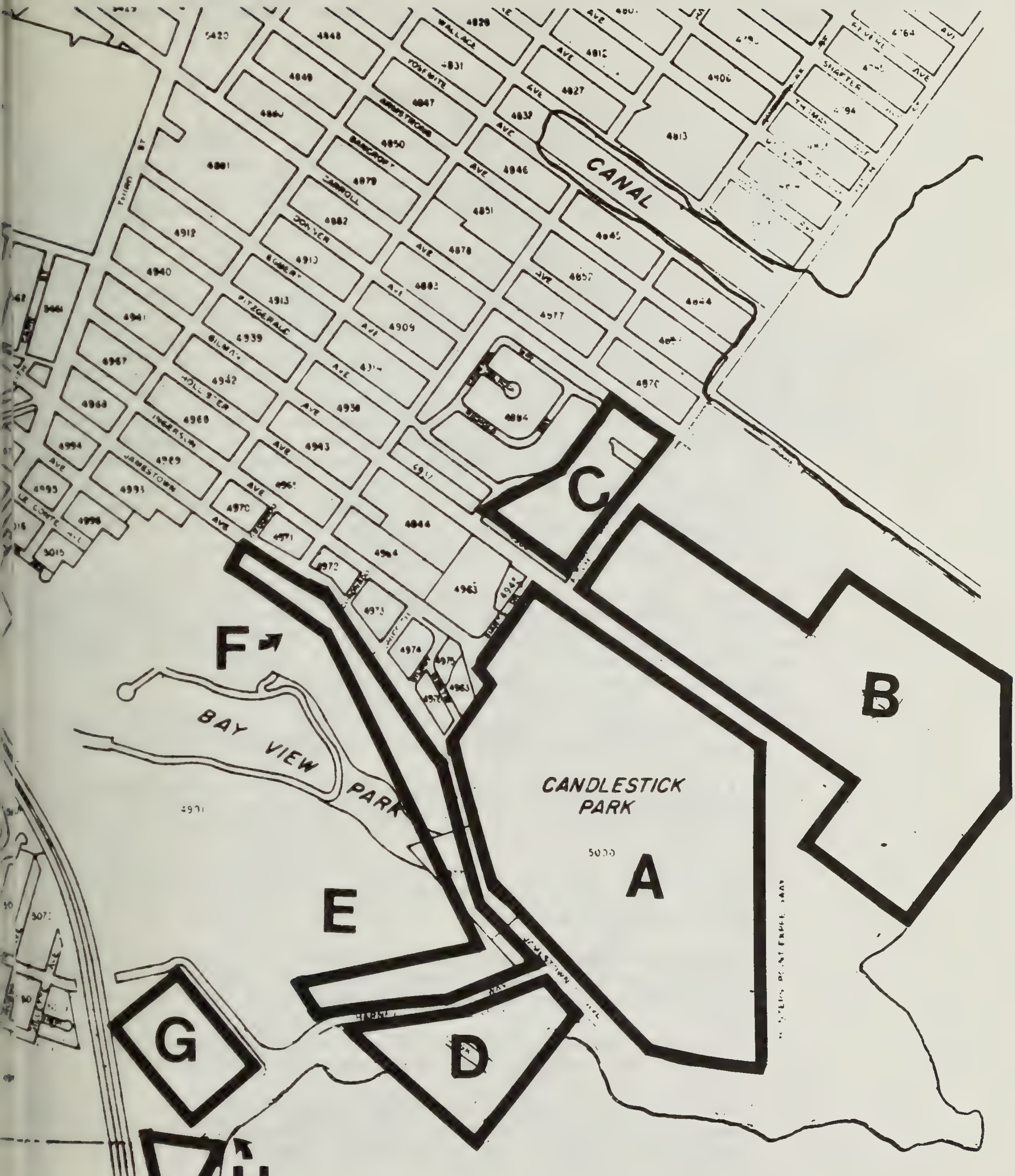


FIGURE 4

EXISTING OFF STREET PARKING SUPPLY

8. Traffic Conditions and Neighborhood Impacts

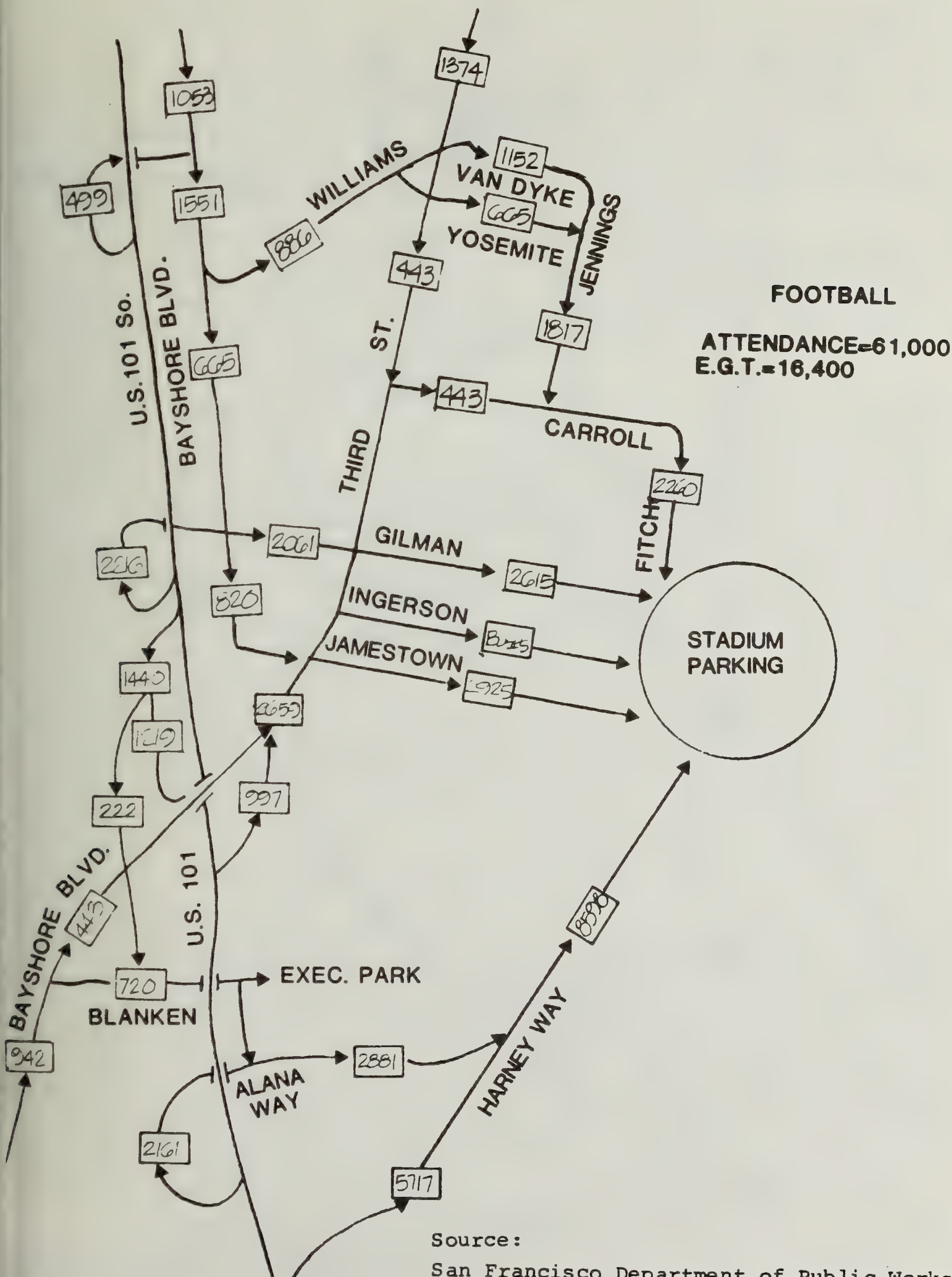
For a capacity weekend football event of 61,000 people, pre-game traffic can be as high as 16,400 vehicles. For the post-game period, traffic can be approximately 14,760 vehicles, assuming that roughly 10 percent of the crowd departs early.

Traffic problems resulting from pre- and post-game conditions are related to origins and destinations of stadium patrons, and the location of the stadium relative to major access routes. Although most patrons ultimately travel in the north-south direction from the stadium, east-west local streets must be utilized to achieve access to the north-south routes (U.S. 101, Third Street, and Bayshore Boulevard). As a result, Jamestown, Ingerson, and Gilman Avenues carry approximately 33 percent of the total pre-game traffic, or about 5,400 vehicles. These same access streets carry 42 percent of the traffic, or 6,200 vehicles during the post-game period. Figures 5 and 6 show existing estimated pre- and post-game traffic volumes on the affected access streets for near capacity football games.

Because of the traffic impacts to local neighborhood streets, residents along Jamestown, Ingerson, Gilman, Paul and Hollister petitioned the Board of Supervisors to eliminate game-related traffic from their streets. The specific neighborhood impacts these residents cited were:

- Game-related parking restrictions (tow-away) require local residents to plan their lives around ball games.
- With game-related parking restrictions, the remaining available parking to local residents is on steep, inconvenient side streets from Jamestown and Ingerson Avenues.
- Reversible one-way on Jamestown Avenue inhibits access to and from residences, particularly with regard to emergency vehicle access.
- During post-game conditions, access to properties on the north side of Gilman Avenue, which is two-way, is difficult, and requires crossing three lanes of traffic.
- Hollister Street between Gilman and Ingerson Avenues is subject to overflow post-game traffic and speeding.
- The exclusive use of Ingerson Avenue for bus, taxi, and emergency vehicle access during both pre- and post-game periods, results in prolonged noise, vibration, and exhaust fumes.
- Littering is a common problem on all access streets.

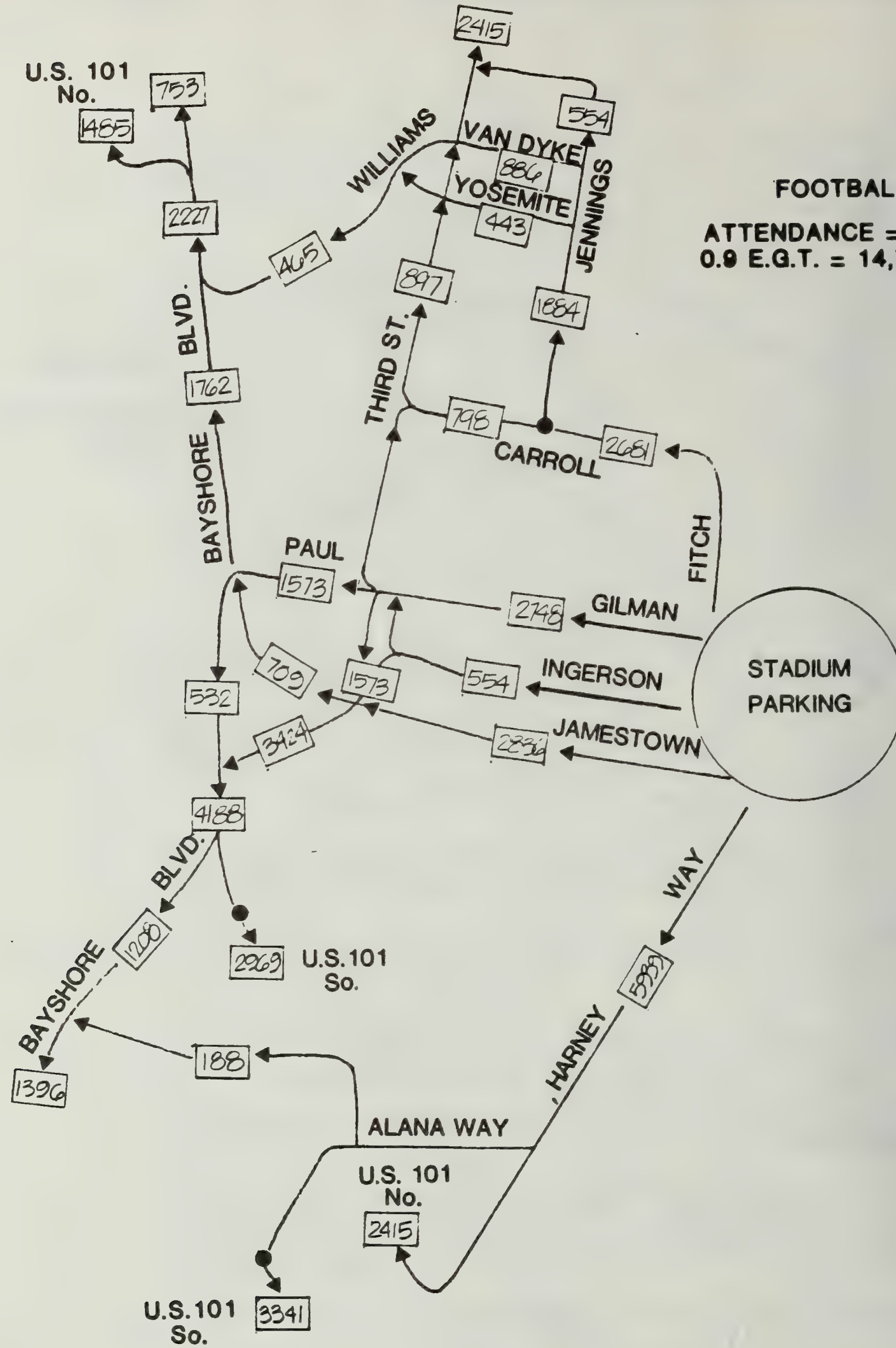
EXISTING PRE-GAME TRAFFIC CONDITIONS **FIGURE 5**



Source:

San Francisco Department of Public Works
Bureau of Engineering, Division of Traffic,
Report on Candlestick Park Access, Oct. 1981

EXISTING POST-GAME TRAFFIC CONDITIONS FIGURE 6



FOOTBALL

ATTENDANCE = 61,000
0.9 E.G.T. = 14,760

Source:
San Francisco Department of Public Works
Bureau of Engineering, Division of Traffic
Report on Candlestick Park Access, Oct. 1981

- The high traffic volumes on Jamestown, Ingerson and Gilman Avenues has accelerated deterioration which could result in property damage to adjacent homes.
- Sunday church services at the St. Paul of the Shipwreck Church have had to be discontinued during ball games due to parking and access problems to the church.

Other residents of Blanken and Tunnel Avenues, and of the Visitacion Valley have voiced concerns about changes in local street operations which could affect their neighborhood. Presently, there are no game-related traffic restrictions in these areas, and game-related traffic is not excessive.

9. Transit Service During Stadium Events

As described earlier, transit usage to and from Candlestick Park averages about 16 percent. Of this mode-share, approximately eight percent come by Muni bus, and eight percent by charter bus as shown in Table 6. The total number of one-way bus trips (including charter buses) to and from the stadium ranges from 140 trips for weeknight baseball games to 357 trips for football games. Total number of round trip transit seats provided by these levels of service for these events are 7,420 and 18,921 respectively (based on an average of 53 seats per bus and full occupancy).[1] The number of Muni and charter bus trips for pre-game and post-game periods are summarized in Table 6. Express Muni bus lines serving the stadium include the 28-Nineteenth Avenue, 30-Stockton, and 47-Van Ness. Local service is provided via the 15-Third Street and 25-San Bruno. The 25-San Bruno also provides shuttle service between Third Street and Paul Avenue and the stadium.

Future Conditions Without Candlestick Alternatives:

Future development trends in the Candlestick Park vicinity could have a significant effect on the transportation and parking environment regardless of which alternative, if any, is selected. This section presents an analysis of future parking and traffic conditions at Candlestick Park and the surrounding vicinity assuming continued development at the Candlestick Point State Recreation Area (SRA) and the Executive Park office complex. Other developments such as the Southern Pacific Bayshore Office Park are also planned which could contribute further to the future deterioration of transportation conditions along major access corridors to Candlestick Park.

---

(1) Charles Romeyn, Scheduling Department, San Francisco Municipal Railway, telephone communication, April 1983.

TABLE 6: MUNI AND CHARTER BUS TRIPS

		BASEBALL			FOOTBALL
		WEEKDAY	WEEKNIGHT	WEEKEND	
PRE-GAME	MUNI	75 (50)	78 (50)	80 (32)	105 (47)
	CHARTER	17 (17)	27 (27)	49 (49)	91 (91)
POST-GAME	MUNI	31 (31)	24 (24)	31 (31)	70 (62)
	CHARTER	17 (17)	27 (27)	49 (49)	91 (91)
TOTAL BUS TRIPS		140	153	209	357

(31) - Number of buses

64 - Number of one-way trips (in and out)

Sources: Muni Data: Chuck Romeyn, San Francisco Municipal Railway, Scheduling Department, telephone conversation, April 12, 1983

Charter Bus Data: San Francisco Department of Public Works, Bureau of Engineering, Division of Traffic, Report on Candlestick Park Access, 1981.

1. Parking Supply

The long term availability of the existing off-street parking supply is dependent upon two main factors: further development of the Candlestick Point State Recreation Area, and continued development of the Executive Park office complex. The potential impacts on existing parking supplies posed by these developments are discussed below.

a. Shoreline Park Perimeter Lots

Approximately 4,850 parking spaces are located on state-owned property within the boundaries of the Candlestick Point SRA. This includes 3,200 spaces north of Gilman Avenue (in area B of Figure 4), 350 spaces at the corner of Fitch Street and Carroll Avenue (area C) and 1,300 spaces south of Harney Way (area D). Early phases of park development have been completed. Timing of development of the remainder of the park is uncertain due to unstable economic and fiscal conditions at the state level; no horizon year has been established for its completion.[1] In the event that conditions change in the future resulting in full development of the park, from 3,750 to 4,850 parking spaces could be lost depending on whether the 1,100 space lot (400 of the 1,100 spaces are currently developed which are not available to stadium patrons) proposed in the park plan is also made available to stadium patrons.

b. Executive Park Office Complex

The Executive Park office complex presently provides 350 paved parking spaces during nights, weekends, and holidays, and 450 unpaved spaces. Recent discussions between the Candlestick parking operators and Executive Park management have been held regarding the possible short-term lease of an additional 400 spaces for use by stadium patrons, which would increase the total supply at Executive Park to 1,200 spaces.[2]

If an agreement can be reached under long-term parking expansion plans included in the proposed master plan amendment, an additional 5,100 spaces would be created. Approximately 1,200 spaces would be provided in at-grade lots, with the remainder of 3,900 spaces provided in a multi-level garage structures. Of the total 5,100 spaces, only the 2,730 spaces designated for office use and 1,200 at grade spaces could be potentially available to Candlestick patrons.

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(1) Carol Nelson, California State Department of Parks and Recreation, telephone conversation, April 1983.

(2) Nicholas Leonoudakis, President, Fineway Parking Company, Candlestick Park, personal communication, April 7, 1983.

c. Other Perimeter Parking Lots

The great majority of the remaining parking supply in perimeter lots is either non-park land owned by the State, or private land. Although no development proposals are currently known, it is possible that these lands could also be lost to future development. This includes 1,780 spaces currently leased from the State south of Jamestown Avenue, north of Harney Way, and east of U.S. 101; and 1,800 private spaces located north of Gilman and south of Beatty Avenue (see Figure 4, Areas E and F).

d. Summary of Future Parking Supply

Table 7 presents a summary of the range of future parking supply for Candlestick Park based upon three possible future conditions. The optimum condition assumes that economic and fiscal conditions will prevent any further development at Shoreline Park, or any of the surrounding areas except the Executive Park. Joint use of Executive Park spaces is assumed. Under this scenario, which is considered unlikely, about 20,200 spaces would be available. The second condition, a more realistic case, recognizes that development of the Shoreline Park and Executive Park will proceed, and that spaces currently available in these areas would be lost for future use by stadium patrons. If joint use of the parking facilities to be provided by these developments does not occur, 11,818 spaces would remain available. With joint use, the parking supply essentially would not change and 16,848 spaces would be available. Finally, the worst case condition represents the future parking supply if all surrounding non-city owned lands are allowed to develop. In this case, only 8,238 spaces would be available.

From review of Table 7, it is apparent that the State of California and developers of Executive Park play key roles in the future of parking at Candlestick Park. Since parking supplies on surrounding lands are subject to displacement by future development, the City should require that parking provided by these projects is made available for joint use by Park patrons. In the case of State owned property, the City should communicate with the State to encourage joint use of their facilities. As an additional mitigation, strong emphasis should be placed on making better use of transit services to the stadium to reduce parking demand, especially Southern Pacific train service.

2. Traffic Conditions

Future traffic conditions on the local street network and regional access corridors could be influenced by proposed developments at Executive Park, Candlestick Point SRA, and Bayshore Park, as described in the following sections.

TABLE 7

POTENTIAL CHANGES IN PARKING SUPPLY

Parking Area	EXISTING SPACES	FUTURE SPACES			
			Realistic Case		
		Optimum Case	With Joint Use	Without Joint Use	Worst Case
1. Main Lot	7,213	7,213	7,213	7,213	7,213
2. Candlestick SRA[a]	4,850	4,850	1,100	0	0
3. Other Non-SRA State Lands[b]	1,780	1,780	1,780	1,780	0
4. Privately Owned[c]	800	1,400[e]	1,800	1,800	0
5. Executive Park	1,200	3,930	3,930	0	0
6. City Owned[d]	375	375	375	375	372
7. On-Street	650	650	650	650	650
TOTAL	16,868	20,198	16,848	11,818	8,238

[a] Includes lots north of Gilman Avenue, and south of Harney Way.

[b] Includes lots south of Jamestown Avenue, north of Harney Way and east of U.S. 101.

[c] Includes lot north of Gilman Avenue and overflow lot south of Beatty Avenue. Non-Executive Park land.

[d] Includes lot west of Fitch Street owned by City Housing Authority.

[e] Includes 600 spaces to be developed at the overflow lot south of Beatty Avenue.

a. Executive Park Office Complex

Completion of the final phases of Executive Park is expected to generate about 16,700 vehicle trip ends per day and 2,700 peak hour trip ends. Virtually all of this traffic would be generated in the vicinity of the Executive Park complex on Alana Way, Harney Way and Executive Park Boulevard. Little traffic is expected to occur on Hunters Point Expressway, or local streets such as Jamestown Avenue and Gilman Avenue.[1]

Under worst case conditions, the levels of traffic generated by Executive Park at project completion are projected to degrade vehicular levels of service from A to F at the intersections of Harney Way and Alana Way, and Alana Way and Executive Park Boulevard (assuming no roadway improvements are made). Possible improvements to be examined by the project developer include traffic signals at Alana Way at Executive Park Boulevard, Harney Way at Executive Park Boulevard, Harney Way at Alana Way/Thomas Mellon Drive and the Alana Way on-ramp to U.S. 101, and roadway widenings along Harney Way, and Executive Park Boulevard. These possible improvements would be staged over a ten year development period.

b. Candlestick Point State Recreation Area

On prime recreational days, the park is projected to attract an attendance of 5,000 persons. Based on vehicle occupancy of three persons, an approximate traffic volume of 1,667 vehicles would be generated along Alana Way, Harney Way, Hunters Point Expressway, and Gilman Avenue. However, these volumes would be unlikely to conflict with capacity Stadium events.

c. Bayshore Office Park and Baylands Development Area

The Bayshore Office Park and Baylands Development Area proposed by the Southern Pacific Development Company covers 507 acres in the area southwest of Candlestick Park between Bayshore Boulevard and U.S. 101 in the City of Brisbane. The proposed development includes a mix of industrial, commercial, and office uses in addition to the existing railroad operations and tank farm. At full development in 1995, the project could generate from 39,150 to 42,490 twenty-four-hour traffic volumes depending on the land use option selected for the Baylands Development Area.[2]

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(1) Environmental Science Associates, Executive Park Employee Travel Survey, 1982.

(2) Southern Pacific Development Company, Proposed Specific Plan for Bayshore Office Park and Baylands Development Area, Brisbane, California, July 1982.

d. Summary of Traffic Conditions

Proposed development projects in the Candlestick Park vicinity will generate traffic which could conflict with post-game traffic leaving the stadium following afternoon events. The cumulative effect of these projects may require that contingency plans (ridesharing, flex-time, etc.) be developed for project employees to coincide with weekday baseball events. Improved transit service to the area would also serve to minimize congestion and traffic conflicts. An alternative would be discontinuation of all weekday baseball games to eliminate cumulative traffic congestion and impacts.

Analysis of Candlestick Park Schemes:

1. Scheme 4: Maximize Light Industrial/Office Park

a. Traffic and Parking

Based on the area allocations for each land use, and standard references for trip generation,(1) this scheme would generate 13,579 average weekday vehicle trip-ends, and 2,035 trip-ends during the PM peak period (4:00 to 6:00 PM). If parking is provided per the City Planning Code requirements, no additional parking impacts to the surrounding area would occur.

Based on modal split and residential distribution data obtained from a travel survey of Executive Park employees conducted by Environmental Science Associates, 90 percent of the generated trips would be via the private automobile, in the following regional distribution:

- San Francisco 37%
- Peninsula 43%
- East Bay 12%
- North Bay 8%

Applying these factors to the total automobile trips results in the following average weekday traffic volumes for each major corridor:

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(1) Institute of Transportation Engineers, Trip Generation, An Informational Report, Second Edition, 1979.

- 4,522 trips originating from San Francisco
- 5,255 trips from the Peninsula
- 1,467 trips from the East Bay
- 978 trips from the North Bay

For the purpose of identifying probable access routes to the Candlestick Park site, it is assumed that:

- 67 percent of the San Francisco-based trips (3,030 trips) would use US-101 to Alana Way for access; and 33 percent (1,492 trips) would be distributed equally to the Bayshore Boulevard and Third Street corridors.
- 50 percent of the East Bay-based trips (734 trips) will access the site via U.S. 101 to Alana Way, and the remaining 50 percent of trips will come from the south via Harney Way.
- 100 percent (5,255 trips) of the Peninsula-based trips will access the site via northbound U.S. 101 to Harney Way.
- 100 percent (978 trips) of the North Bay-based trips will access the site via southbound U.S. 101 to Alana Way.

Assuming 90 percent auto mode split, the peak period distribution of 2,035 trips would result in the following additional trips:

- An increase in traffic on U.S. 101 southbound of 711 vehicles.
- An increase in traffic on U.S. 101 northbound of 897 vehicles, and
- An increase in traffic of 224 vehicles (distributed equally) on the Bayshore Boulevard and Third Street corridors.

The resulting trips on U.S. 101 would compound the directional congestion problems which typically occur in the southbound direction during the P.M. period, and in the northbound direction during the A.M. period. No significant traffic impacts would result on Bayshore Boulevard and Third Street. The alternative would have the benefit, however, of eliminating all traffic and parking impacts, many of which occur in the non-peak periods, currently associated with the stadium.

b. Transit

The potential transit demand for this scheme was estimated based on a 10 percent transit mode share of the 13,597 total average weekday vehicle trip-ends. This scheme would generate approximately 1,360 person trips on transit per day. During the P.M. peak period, this scheme would generate about 205 person trips on transit. To accommodate this potential demand, re-routing or extension of existing lines such as the 56-Rutland, 29-Sunset and/or 15-Third Street would be required.

2. Scheme 5: Mixed Use With Renovated Stadium

This scheme would entail new traffic generated during the weekdays due to the proposed mixed uses, and essentially the same stadium traffic and parking demand conditions as exist currently.

a. Traffic

Based on the mixed land uses for this scheme, approximately 24,840 average weekday vehicle trips and 3,527 peak period trips would be generated. Using the mode-split and regional trip distribution procedures described earlier, the following average weekday traffic volumes would be generated:

- 8,272 San Francisco-based trips
- 9,613 Peninsula-based trips
- 2,683 East Bay-based trips
- 1,788 North Bay-based trips

Using the same access route assignments from Scheme 4 results in the following:

- 5,542 San Francisco-based trips would occur on U.S. 101 to Alana Way for access, and 2,730 trips would be distributed equally to the Bayshore Boulevard and Third Street corridors.
- 1,342 East Bay trips would occur on U.S. 101 southbound to Alana Way for access, and the remaining 1,342 trips would occur on U.S. 101 northbound to Harney Way.
- 9,613 (100 percent) of the Peninsula trips would occur on northbound U.S. 101 to Harney Way.

- o 1,788 (100 percent) of the North Bay-based trips would occur on southbound U.S. 101 to Alana Way.

The peak period traffic of 3,527 would be distributed as follows:

- o An increase in southbound U.S. 101 traffic of 1,231 vehicles (from San Francisco, East Bay and North Bay origins).
- o An increase in northbound U.S. 101 traffic of 1,555 vehicles (from Peninsula and East Bay origins).
- o An increase in auto traffic of 388 vehicles distributed equally to Bayshore Boulevard and Third Street.

No significant traffic impacts would occur on Bayshore Boulevard and Third Street. Traffic volumes generated by the scheme would exceed the capacity of U.S. 101 (both directions) during peak periods.

Assuming no addition to the existing 61,000 seat capacity of the stadium, traffic associated with the renovation of Candlestick Park would not increase over the existing conditions. Very little overlap of P.M. peak period traffic generated by the mixed use development with stadium traffic would be expected, with the exception of a long afternoon baseball game or a Monday night football game. For these cases, contingency plans discussed previously would need to be developed, or day games would need to be discontinued.

b. Parking

This scheme includes the provision of 15,000 parking spaces. A multi-level central parking structure located on the existing main lot would contain 10,000 spaces. At-grade parking for 4,000 spaces would be located on the north end of the main lot, and roughly 1,000 spaces would be developed off-site.

If the majority of the total parking to be provided were made available to stadium patrons during nights, weekends and holidays; most of the parking demand associated with the renovated stadium (16,400 spaces) would be accommodated. Only an additional 1,400 spaces would need to be maintained off-site to satisfy remaining demand. Therefore, provision of 15,000 parking spaces in this scheme lessens the potentially significant impact of major losses of existing parking due to State and private development identified earlier in this section.

c. Transit

The mixed use component of this scheme would generate approximately 2,484 trips on transit for an average day, and roughly 353 trips during the P.M. peak period. As in Scheme 4, re-routing or extension of the existing Muni lines 15, 29, and 56 should be considered to meet this demand.

The transit impacts of the renovated stadium are essentially the same as the existing condition.

3. Scheme 6: New Stadium (70,000 seat capacity)

a. Stadium Traffic

A new 70,000 seat stadium is estimated to generate peak one-way pre-game traffic volumes of 18,836, an increase of roughly 2,436 or 15 percent over existing peak conditions. This is based on application of the existing traffic generation rate (27 percent of total peak attendance for a 61,000 seat stadium) to the new stadium. This incremental increase in pre- and post-game traffic has been distributed to the stadium access street network and is shown in Figures 7 and 8. These traffic estimates are based on the assumption that existing mode split, origin/destination, and vehicle occupancy patterns will continue.

b. Parking Demand

A 70,000 seat stadium is estimated to generate parking demand for roughly 18,836 spaces, based on the same parking demand to attendance ratio of about 27 percent discussed above for traffic conditions. This represents an increase in parking demand of 15 percent or 2,436 vehicles over existing conditions.

Construction of a new, larger stadium would intensify parking and congestion problems which already occur for the existing stadium, if new parking supplies are not developed concurrently with the new stadium. The potential changes in parking supply were described in detail earlier in Table 7. Based on each of the possible future parking conditions (optimum, realistic, worst case) a 70,000 seat stadium would result in potential parking deficits as follows:

o Optimum Case	1,362 spaces
o Realistic Case:	
With Joint Use of Parking Supplies	1,988 spaces
Without Joint Use of Parking Supplies	7,018 spaces
o Worst Case	10,598 spaces

FUTURE PRE-GAME TRAFFIC CONDITIONS

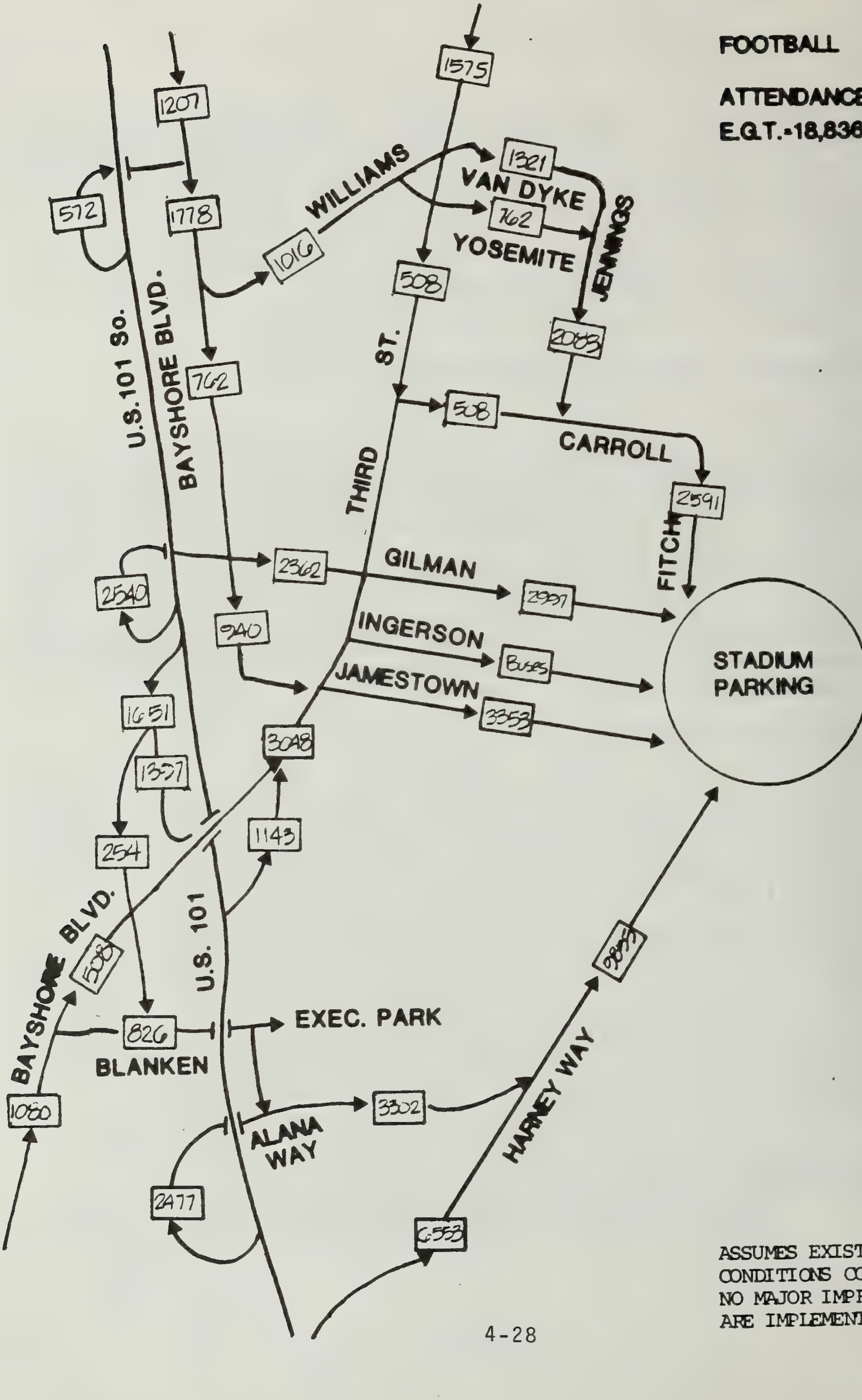


FIGURE 7

FOOTBALL

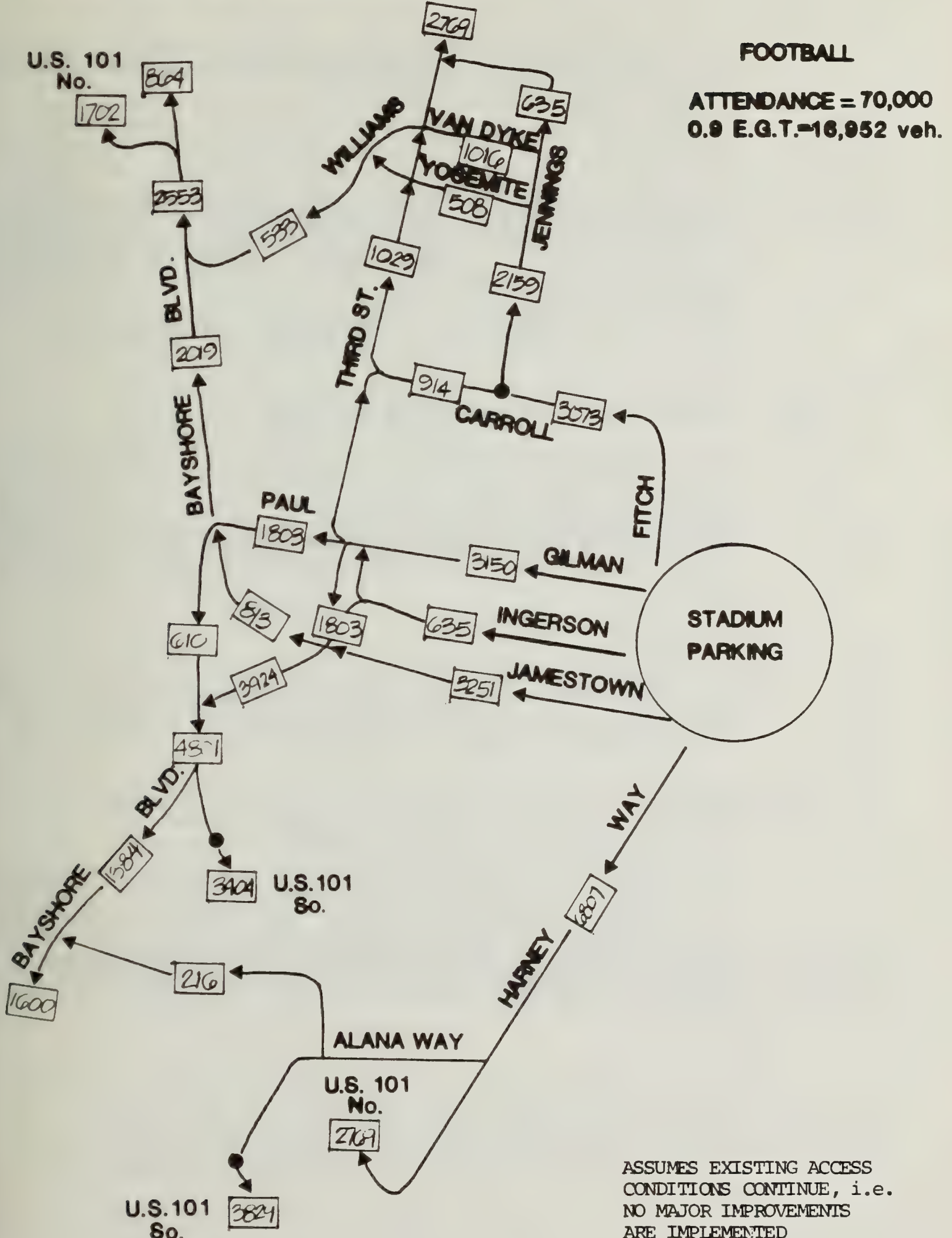
ATTENDANCE 70,000

E.G.T.-18,836 veh.

ASSUMES EXISTING ACCESS CONDITIONS CONTINUE, i.e
NO MAJOR IMPROVEMENTS ARE IMPLEMENTED

FUTURE POST-GAME TRAFFIC CONDITIONS

FIGURE 8



ASSUMES EXISTING ACCESS
CONDITIONS CONTINUE, i.e.
NO MAJOR IMPROVEMENTS
ARE IMPLEMENTED

Such a broad range of potential parking deficits reinforces the need for the City to maintain and/or secure additional parking supplies for stadium use.

c. Transit

A new stadium of 70,000 seats could generate an additional 1,440 person trips on bus transit. Assuming that the number of additional transit patrons is the same for pre-event and post-event and the average loading per bus is 53 passengers, an additional 27 bus trips would be required. Of this total perhaps two-thirds or 18 trips would occur on Muni lines, with the remaining 9 trips occurring on charter buses.

4. Scheme 7: New Stadium With Mixed Use

This scheme would result in the same traffic, parking and transit impacts described in the mixed use development component of Scheme 5, and the new stadium of Scheme 6. Slightly greater traffic impacts (about 2,436 more vehicles) could result during occasional periods of mixed use development and stadium traffic overlap than those described in Scheme 5.

a. Transit

This scheme would entail the same transit impacts as those described for the mixed use component of Scheme 5, and the new stadium component of Scheme 6.

5. Scheme 8: Renovated Candlestick Park

This scheme involves construction of a dome over Candlestick Park. Since the stadium capacity would remain 61,000 seats, the existing traffic, parking and transit conditions at Candlestick Park would not change on an event by event basis. However, more events held at the stadium would increase the time during which traffic impacts occur in the surrounding area.

Short and Long Range Improvements and Costs:

This section contains several short and long range recommendations designed to improve traffic and parking access, and reduce adverse neighborhood impacts. Short range improvements which are needed for all stadium schemes (5, 6, 7 and 8) are presented first, followed by long range improvements which are also common to the four alternatives. Other long range improvements which are unique to each alternative including Scheme 4 are presented at the end of this section.

1. Short Range Improvements and Costs (Common to Schemes 5, 6, 7 and 8)

a. Removal of all parking prohibitions in residential areas for all midday and weeknight games (except Friday night) to reduce neighborhood impacts.

   Cost: $ Nominal

b. Mechanically clean all residential streets prior to removal of weekend parking restrictions.

   Cost: $ Nominal

c. Change Candlestick Park signing on southbound U.S. 101 to two key exits, Silver Avenue and Alana Way.

   Cost: $ 10,000

d. Repair of Carroll Avenue pavement east of Third Street, to accommodate heavier volumes of diverted traffic (assuming long-range recommendations are implemented).

   Cost: $ 900,000

e. Relocation of the western entry gates for the permit parking to an alternate location to alleviate stadium traffic congestion at the intersection of Harney Way and Jamestown Avenue.

   Cost: $ Nominal

f. Re-striping of the intersection limit lines of Alana Way and Harney Way; and the lane lines along Harney Way and Hunters Point Expressway.

   Cost: $ 4,000

g. Develop variable overhead message signs to better guide pr- and post-game traffic on major reversible one-way streets (i.e., Harney Way, Hunters Point Expressway, Jamestown and Gilman Avenues).

   Cost: $140,000 total ($35,000 per sign)

h. Erection of non-variable overhead signage at the intersection of Alana Way and Harney Way to guide post-game traffic.

   Cost: $ 50,000

i. Develop a shuttle bus system providing service from the Southern Pacific Railroad station at South Bayshore Boulevard to the stadium, for peak attendance events.

   Cost: $ 30-40 per vehicle-hour depending on transit operator (total cost will depend on operating requirements of shuttle system)

2. Long Range Transportation Improvements and Costs (Common to Schemes 5, 6, 7 and 8)

Even if no action is taken to change the existing stadium at Candlestick Park, several major long range transportation improvements would be needed to alleviate current traffic problems in the vicinity of the stadium. All of the schemes which include a new or renovated stadium (Schemes 5, 6, 7 and 8) will therefore require extensive and costly improvements to the transportation system. Scheme 4, the Light Industrial Alternative, would require fewer and less costly improvements than the stadium alternatives because of much lower peak period traffic flows and less impacts to surrounding neighborhoods.

Several long range access improvement alternatives were developed and analyzed by the San Francisco Department of Public Works in the Report on Candlestick Park Access (1981). These alternatives were developed specifically to improve traffic and access conditions during stadium events. Elimination of stadium automobile traffic from neighborhood streets was a common element of all the long-range alternatives.

On December 18, 1981, the San Francisco Board of Supervisors passed Resolution Number 1012-81, establishing a policy in support of Long Range Alternative VII (see Appendix A). The components of this alternative as endorsed by the Board of Supervisors are depicted in Figures 9 and 10. These improvements are common to all alternatives except Scheme 4.

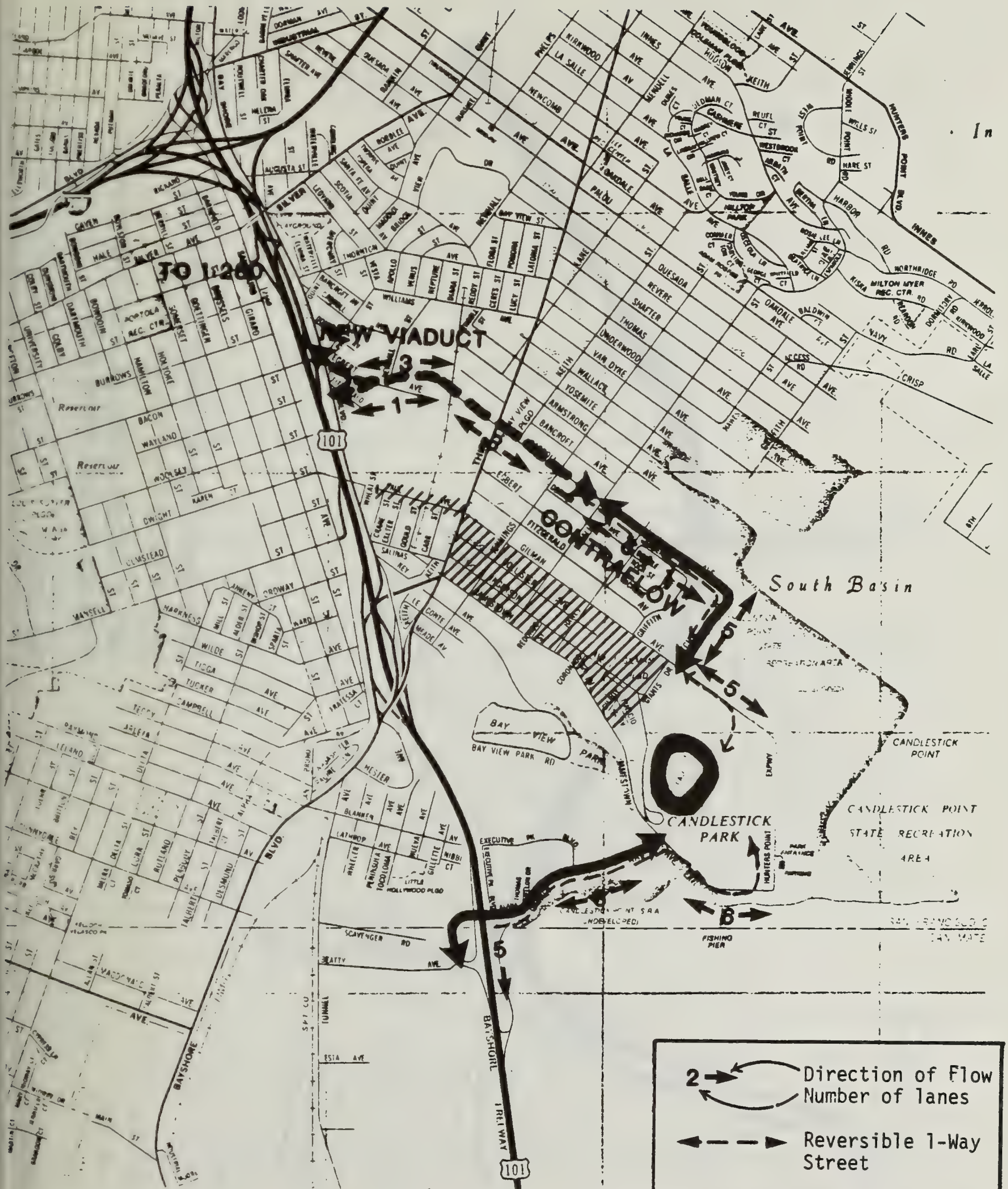


FIGURE 9

LONG RANGE ALTERNATIVE

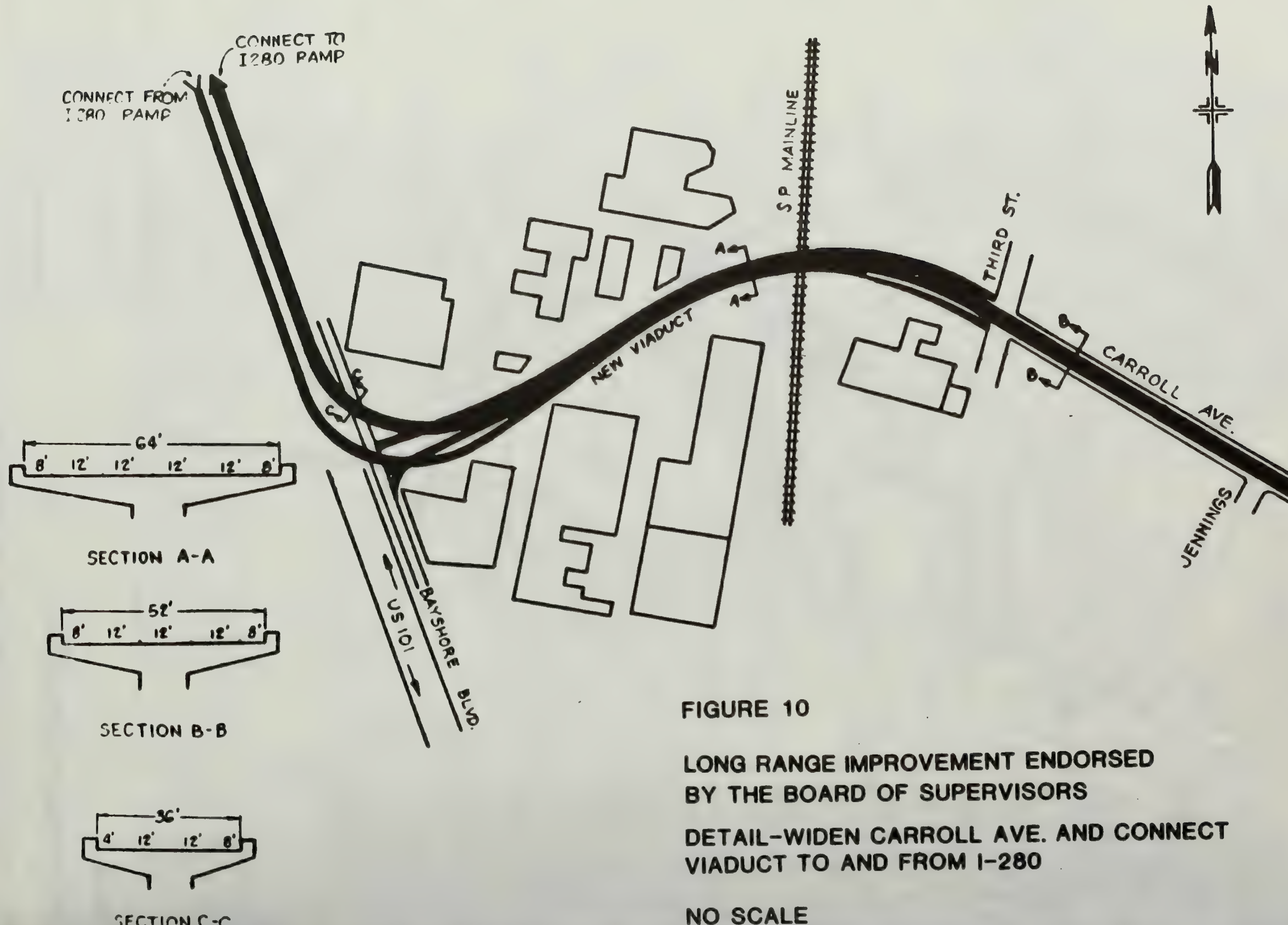


FIGURE 10

LONG RANGE IMPROVEMENT ENDORSED
BY THE BOARD OF SUPERVISORS

DETAIL-WIDEN CARROLL AVE. AND CONNECT
VIADUCT TO AND FROM I-280

NO SCALE

Additional recommended improvements which are unique to each alternative, including Scheme 4, are described at the end of this section.

The recommended long range improvements are as follows:

a. Widen Harney Way between Jamestown Avenue and Alana Way from five lanes to six lanes.

   Cost: $ 540,000

b. Widen the Alana Way on-ramp to U.S. 101 southbound from one lane to two lanes.

   Cost: $ 240,300

c. Widen U.S. 101 southbound between Alana Way and Route 380 (a distance of five miles) from four lanes to five lanes.

   Cost: $ 30 million

Note: Recent discussions with California State Department of Transportation officials indicate that widening of US-101 from Alana Way to Route 380 (Improvement C) could be prohibitively expensive (possibly in excess of $60 million for construction and right-of-way acquisition).[1,2,3]

An alternative to widening southbound US 101 by one lane for a distance of five miles, is the limited widening for a distance of 1.5 miles (roughly 8,000 feet). Construction of one additional travel lane would increase the capacity of this section of US 101 by approximately 1,800 vehicles per hour. The feasibility of developing this alternative concurrently with a new on/off ramp system to Marina Boulevard should be investigated.

   Cost: $2.7 million

(1) Mr. Ernie Satow, Senior Transportation Engineer, California Department of Transportation, Project Development Division, telephone communication, April 13, 1983.

(2) Mr. Paul Hensley, Senior Transportation Engineer, California Department of Transportation, telephone communication, April 8, 1983.

(3) Mr. Ralph Harrison, California Department of Transportation, Division of Transportation Planning, telephone communication, April 8, 1983.

d. Construct a contra-flow lane on the Fitch Street to Carroll Avenue route to Third Street.

   Cost: Included in cost for Item e.

e. Widen Fitch Street and Carroll Avenue from four lanes to five or six lanes.

   Cost: $7.323 million, includes $6 million for land acquisition /business relocation, and $1.323 million for construction.

f. Construct a new, above grade viaduct three to four lanes in width, connecting Carroll Avenue (east of Jennings Street) to and from Interstate 280; and ramps to and from Bayshore Boulevard and Third Street.

   Cost: $ 32.175 million

Excluding the widening of U.S. 101, the estimated total cost of the above long range improvements is $40.3 million (in 1983 dollars). If the full widening of US 101 for 5 miles ($30 million) is included, the estimated total cost is $70.3 million. Widening of US 101 for a distance of only 1.5 miles ($2.7 million) would lower the total estimated cost to $43.0 million.

3. Other Long Range Improvements

Other long range improvements unique to each alternative are described below for each Candlestick Park scheme.

Scheme 4: Maximize Light Industrial

a. Resurface Hunters Point Expressway from Jamestown Avenue to Fitch Street.

   Cost: $ 3.2 million

b. Reconstruct on-ramp to U.S. 101 northbound from Executive Park Boulevard.

   Cost: $ 500,000

c. Realign the intersection of Alana Way and Harney Way to improve visibility and traffic circulation.

Cost: \$ 150,000

d. Install traffic signal light at the intersection of Alana Way and Harney Way.

Cost: \$ 50,000

e. Construct new internal roadways to improve on-site traffic circulation.

Cost: \$ 13.50 per square foot (total cost will depend on amount of roadway required which is undetermined at this conceptual planning stage)

f. Extend or re-route existing Muni transit lines 56-Rutland, 29-Sunset, and 15-Third Street to provide convenient transit service.

Cost: Undetermined until detailed operating requirements, service levels, transit shelters and design criteria are specified.

In addition, it is recommended that a Transportation Systems Management Program be developed. The cost of this would be nominal and borne by the developer.

Scheme 5: Mixed Use With Renovated Stadium

Same improvements as endorsed in Long Range Alternative VII, and Scheme 4, plus:

a. Develop a parking management and information program to reduce parking demand, and improve utilization of existing parking supplies.

Cost: Nominal

b. Develop a contingency plan to minimize traffic and parking impacts due to overlap of stadium and mixed use development traffic.

Cost: Nominal

Scheme 6: New Stadium

Implement Long Range Alternative endorsed by the Board of Supervisors.

Implement improvements a and b of Scheme 5, plus:

a. Establish conditional joint-use policy for competing developments to allow stadium patrons to use parking supplies created by new development. This could be implemented through zoning code or building permit process at no cost.

Scheme 7: Mixed Use With New Stadium

Implement Long Range Alternative endorsed by the Board of Supervisors.

Implement improvements contained in Schemes 5 and 6.

Scheme 8: Renovated Stadium

Implement Long Range Alternative endorsed by the Board of Supervisors.

APPENDIX A

VEHICULAR LEVEL OF SERVICE DESCRIPTIONS

Appendix A

LEVELS OF HIGHWAY SERVICE INTERPRETATION

LEVEL OF SERVICE	DESCRIPTION	DELAY RANGE (Sec. per Vehicle)	VOLUME TO CAPACITY RATIO
A	Excellent operation. All approaches to signalized intersections appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation. No vehicles wait longer than one red traffic signal indication.	0-16	0-.60
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to a signalized intersection may occasionally be fully utilized and a substantial number of cycles are approaching full use.	16-22	.60-.70
C	Good operation. Occasionally drivers have to wait through more than one red signal indication, and back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted.	22-28	.70-.80
D	Fair operation. Cars are required to wait through more than one traffic signal cycle during short peaks. There are no long-standing traffic queues. Typical design goal for planning purposes.	28-35	.80-.90
E	Poor operation. Some longstanding vehicular queues develop on critical approaches to intersections. Delays may be up to several signal cycles.	35-40	.90-1.00
F	Forced flow. Represents jammed conditions. Backups from locations downstream or on the cross street may restrict or prevent movement of vehicles out of the intersection approach lanes; therefore volumes carried are not predictable. Potential for stop and go type traffic flow.	40 or greater	Over 1.00

Source: Based on National Academy of Sciences, Highway Capacity Manual, 1965 and Draft Final Report for the New Highway Capacity Manual.

APPENDIX B

BOARD OF SUPERVISORS RESOLUTION
NUMBER 1012-81

APPENDIX B

BOARD OF SUPERVISORS RESOLUTION
NUMBER 1012 - 81

As amended in Bd.
12/14/81

FILE NO. 154-80-2

RESOLUTION NO. 1012-81

ESTABLISHING POLICY OF THE BOARD OF SUPERVISORS IN SUPPORT OF LONG RANGE ALTERNATIVE PLAN NO. VII OF THE "REPORT ON CANDLESTICK PARK ACCESS, OCTOBER 1981" SUBJECT TO MASTER PLAN REVIEW BY THE DEPARTMENT OF CITY PLANNING.

WHEREAS, The Board of Supervisors by its Resolution No. 610-59 established certain regulations relating to the flow of traffic to and from Candlestick Park on such days as events are scheduled at Candlestick Park; and

WHEREAS, The steady flow of traffic in this area over many years has caused a severe impact on its residents and their property because of excessive noise, pollution and unsafe traffic conditions; and

WHEREAS, The Department of Public Works has submitted a comprehensive survey entitled "Report on Candlestick Park Access, October 1981" which includes both long-range and short-range alternative access plans to reduce the traffic problem in that area: and

WHEREAS, Long Range Alternative Plan No. VII is the plan most supported by the community residents; now, therefore, be it

RESOLVED, That the Board of Supervisors of the City and County of San Francisco does hereby establish policy in support of Long Range Alternative Plan No. VII as described in "Report on Candlestick Park Access, October 1981" subject to Master Plan review by the Department of City Planning.

FURTHER RESOLVED, That the plan be amended at Planning Department level to retain present method of access by Muni and other public transit or an equivalent level and speed of Muni access to Candlestick Park.

Passed by Board of Supervisors on December 7, 1981.
Signed by the Mayor on December 8, 1981.

5. ECONOMIC IMPACTS

A. SCOPE

The scope of service for conducting an economic impact analysis of the doming of Candlestick is presented below:

Task 1: Review the data presented in the Giants' report entitled "The Future of Candlestick Park" for possible adjustment. The detailed market and financial analysis prepared by the Giants will not be redone in this task. However, a review and evaluation of the appropriateness and accuracy of this analysis will be conducted. The primary product of this task will be a general review of the adequacy of the existing data in the Giants' study.

Task 2: Determine the potential spin-off effects of a multi-use sports facility at Candlestick.

Task 3: Estimate the potential direct and indirect revenue benefits from alternative use of a downtown site.

In order to provide the most useable economic impact analysis for comparison purposes, ERA has expanded this scope and subdivided the analyses into the following parts:

	For A Domed Candlestick or New Stadium at Candlestick	
Economic Impacts	Stadium Only	Stadium Plus Commercial Development
A. From Operations		
B. From Expenditures In Nearby Areas		
C. From Development of Unused Site Downtown		
D. Induced New Development		

B. DATA

This subsection is divided into the following categories:

- o The Economic Impact Model
- o Per Capita Expenditure Data
- o Review of the Giants' Study
- o Case Studies of Impact in Other Cities
- o List of Major Data Sources

The Economic Impact Model

ERA has developed a computerized Economic Impact Model which has been applied to this analysis. The primary sources of economic impacts which are evaluated by the model are listed in Table 1. For each source of impact, Table 1 also shows the primary types of impacts which are evaluated.

Per Capita Expenditures

Per Capita expenditures at stadium is a key factor in evaluating economic impacts. In order to estimate these per capita expenditures, ERA has reviewed and evaluated numerous sources of data including various studies, and extensive telephone interviews with cities which have stadiums. A summary of findings from this data collection and analysis effort is presented in Table 2. Based on a review of this information, and applying judgment to account for the unique characteristics of San Francisco and the Bay Area, ERA concluded that the best estimate for per capita expenditures in the downtown area is $6.00 per person for restaurants (based on the Seattle data) and $3.40 for retail expenditures (based on the Minneapolis data). Per capita expenditures for attendees at stadium events who stay overnight in hotels is estimated at $46.47 based upon typical hotel room rates in San Francisco.

Note that these figures represent expenditures in a downtown area for a centrally located stadium. These figures are used for the downtown stadium alternative. However, only 40 percent of these per capita expenditures are used in the Candlestick analysis. This difference is discussed further below.

Review of the Giants' Study

Our assignment is limited to a brief review of the Giants' study and specifically excludes any detailed market and finacnial analysis which may be required to update this study. It appears that precise estimates of net operating income from a stadium are less important to the economic impact evaluation of alternatives than many other factors. However, it should be noted that the projected NOI of a stadium alternative is important in two respects:

Table 1
SOURCE AND TYPE OF ECONOMIC IMPACTS

Source of Impact	Type of Impact
A. From Operation	Payroll; concessions tax revenue NOI or Possessory Interest tax Admissions Tax Expenditures Jobs; payrolls
B. From Expenditures In Nearby Area	Tax revenues Expenditures Jobs Payrolls
C. From Development of Unused Site	Tax revenues Expenditures Jobs Payrolls
D. From Development on Stadium Site	Tax revenues Expenditures Jobs Payrolls
E. Induced New Development	Potential for new construction to accommodate new expenditures in the area

Table 2

REPORTED PER CAPITA EXPENDITURE OFF-SITE
AT VARIOUS STADIUMS

	Restaurant	Retail	Hotel	Other	Total
San Francisco[1] (Individual '82 Dollars)	$28.23	$82.96	$83.66		$86.5
Per Capita	$9.85	$17.11	$2.65		$30.98
Cinncinati[2] Total Expenditure (including Hotel rates)[3]	$8.5 mil.	$3.5 mil.	43 mil.		$22-25
Per Capita	$4.25	$1.75	$1.5		$11-28
Inflated to 1982 Dollars	$10.39	$4.28	$3.66		
Minneapolis[4] (Projected 1982) Per Capita Expenditure	$3.00	$3.00	$30.00	$5.00	$43.00
Pittsburgh[5] (Total Fan Expenditure)	$10.6 mil.		$1.3 mil.		
Per Capita	$6.52		$14.72		
Inflated to 1982 Dollars	$8.92		$20.14		

[1]Bay Area Residents Survey: mean individual expenditures.
[2]1971 Prices; 2 million attendants; Adjusted hotel rate - divided by 140,000 fans.
[3]Adjusted expenditure for 1.8 persons per room?
[4]Other consist of 4.00 gas, oil; local transportation; total includes entertainment expenditure not shown; Hotel rate only for actual guest.
[5]Only shows expenditure by baseball fans; total expenditure divided by 1,630,318 basebal paid attendance for 1975 to find per capita expenditure.

Table 2
(continued)

	Restaurant	Retail	Hotel	Other	Total
Seattle[6]	$6.00		$6.15	$0.33	
Baseball	$4.80		$6.42	$0.31	$32.25[7]
(Inflated)	$6.57		$8.80	$0.42	
Football	$6.07		$5.41	$0.29	$27.51
(Inflated)	$8.32		$7.41	$0.40	
Basketball	$3.24		$1.02		$15.52
NTES (1977)[8]	$15.31		$7.82	$3.60[9]	
Inflated to 1982 Dollars	$25.00		$12.77	$5.88	
ERA Planning Estimate-1982	$6.00	$3.40[10]	$6.44		

[6] Weighted averages by baseball and football attendance and in county and out of county attendance; inflated from 1979 to 1982 dollars.
[7] These totals include ticket and concessions.
[8] National Travel Expenditure Survey, 1977 visits to friends and relatives.
[9] Called incidentals.
[10] Also includes other expenditures.

Source: Economics Research Associates

o It could alert to the City to be wary of a master tenant who depends on the NOI to pay the lease on the stadium, and

o The economic impacts of various stadium alternatives may change depending on NOI, but this will represent only a relatively small effect in the overall economic impacts.

Therefore, only the most significant factors in the Giants' study were considered for change. For purposes of this analysis the following changes were made in the assumptions used for the operations projections of the Giants' study:

1. All parking revenues are excluded for a downtown stadium.

2. The inflation factor of seven percent used in the Giants' study has been reduced to an estimated 4.93 percent, based upon the average annual inflation rate in the past 40 years.

3. Admissions tax of $0.50 per ticket is assumed on all tickets.

4. The stadium operator is assumed to collect an average rent of 25 percent of gross concessions sales from the Giants as well the 49'ers.

There are innumberable other factors in the Giants' study which deserve some further analysis (such as the estimated $2 million per year in advertising revenue going to the stadium operator) and careful monitoring during the implementation phases of this project. However, this level of detailed market and financial analysis is not a part of this review in our current assignment.

Case Studies

To evaluate the potential for induced new development surrounding the various stadium alternatives, ERA conducted a detailed evaluation of case studies in other cities. Those cities evaluated included:

o Cinncinati: Taft Riverfront Stadium

o Pittsburgh: Three River Stadium

o New Orleans: The Superdome

- o Minneapolis: The Humphrey Metrodrome
- o St. Louis: Busch Memorial Stadium
- o Seattle: The Kingdome

Other Data Sources

In addition to all of the data sources described above, ERA reviewed an extensive list of published and unpublished documents including the following major sources:

1. BASSC, Wage and Salary Survey, October, 1982; Alameda, Contra Costa, Marin, San Francisco, San Mateo, Santa Clara.

2. Consumer Price Index - San Francisco, Oakland, 1982; U.S. Department of Labor, Bureau of Labor Statistics, Division of Labor Statistics and Research.

3. Comprehensive Annual Financial Report, City and County of San Francisco, California, June, 1982.

4. City and County of San Francisco, Consolidated Budget and Annual Appropriation Ordinances, Fiscal Year ending June 30, 1983.

5. Official Statement - $18,095,000 City and County of San Francisco various purpose General Obligation Bonds.

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9. Cost/Benefit Analysis Mission Park Land Use, Residential and Maritime Development, July 9, 1982, Revised July 30, 1982.

10. Feasibility Analysis Terra Bay South San Francisco, California, Economics Research Associates, December 1982.

11. Market Analysis Development Potential for Southern Pacific Property, Brisbane, California, September, 1981.

12. The Stadium Industry, Its Economic and Related Impacts, RERC Corporation, April 1978, Prepared for the City of Minneapolis, Stadium Site Task Force.

13. Economic and Related Impacts of the Stadium Development Alternatives Facing the Twin Cities Metropolitan Area, RERC, April, 1978; Prepared for City of Minneaopils Stadium Site Task Force.

14. Bay Area Residents Survey, Economics Research Associates, August, 1982.

15. Industry Wage Survey: Hotels, Motels, May 1978, U.S. Bureau of Labor Statistics, April, 1980, Bulletin 2055.

16. Dollars and Cents of Shopping Centers, 1981.

17. Kingdome Impact Study, June, 1979.

18. Impact of Baseball on the Pittsburgh Economy, 1977.

19. Regional Impact Analysis Pittsburgh Steelers, Department of City Planinng, July 16, 1982.

20. Economic Impact of Riverfront Stadium on the Cinncinati Area, Greater Cinncinati Chamber of Commerce, 1970.

21. Sales Management Survey of Buying Power, 1981-1982.

C. ALTERNATIVES

It is important to note that the alternatives considered from an economic impact point of view for the development of a Candlestick stadium include alternative uses for the downtown site. The alternatives considered for the development of a Candlestick stadium are:

1. Only a domed Candlestick stadium.

2. Only a new stadium at the Candlestick site.

3. A combination of a domed stadium at Candlestick and commercial development as follows:

	1990	1992	1994
Hotel Rooms	400	--	--
Retail (sq. ft.)	50,000	--	--
Office (sq. ft. net)	267,000	267,000	267,000
Dwelling Units	167	167	166

4. Likely development plan for the unused downtown site if Candlestick stadium is domed is:

	1986	1988	1990
Net Office sq. ft.	667,000	667,000	667,000

D. ANALYSIS

The analysis of economic impacts of Candlestick is divided into five major headings as follows:

1. Impacts Resulting from On-Site Operations
2. Impacts Resulting from Expenditures in the Nearby Area
3. Impacts Resulting from Commercial Development on the Candlestick Site with a Stadium
4. Impacts Resulting from Development of the Unused Site
5. Induced New Development from Expenditures in the Nearby Area.

Impacts from On-Site Operations

The economic impacts from the on-site operations of a domed Candlestick are presented in Tables A-1 through A-4. First, attendance at the events at a domed Candlestick are projected based upon the Giants' study. Then concessions revenue from these attendees is estimated and sales tax and admissions tax revenues are calculated. Finally stadium employees and payrolls are presented based upon the Giants' study. Table A-4 then summarizes all these impacts for the period 1987 through 2007. As shown in Table A-4 the total tax revenues and NOI revenues to the City would be approximately $6.1 million in 1987 increasing to $12.5 million by the year 2007.

Impacts from Expenditures in the Nearby Area

Tables B-1 thorugh B-7 present the economic impacts which will result from expenditures off-site by attendees at a domed stadium at Candlestick Park. First, attendance at all events is estimated, and the number of these attendees who will stay overnight in San Francisco is presented. Table B-2 presents per capita expenditures for attendees as well as their total expenditures. However, it is important to note that total expenditures in San Francisco are expected to be only approximately 40 percent of the estimated total expenditures that a typical stadium attendee would make in the vicinity of a central downtown stadium. (As presented in Table 2).

TABLE A-1
DOMED CANDLESTICK: ON-SITE
ATTENDANCE
(,000)

ATTENDANCE	1987										1997										2007
BASEBALL	1800	1650	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
FOOTBALL	581	569	551	551	551	551	551	551	551	551	551	551	551	551	551	551	551	551	551	551	551
BASKETBALL	451	431	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410	410
CONS. SHOWS	0	200	316	316	316	316	316	316	316	316	316	316	316	316	316	316	316	316	316	316	316
OTHER	195	195	234	234	234	234	234	234	234	234	234	234	234	234	234	234	234	234	234	234	234
TOTAL	3027	3045	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011	3011

1) **Attendance figures from "Future of Candlestick" study.**

TABLE A-2
DOMED CANDLESTICK: ON-SITE
SALES AND ADMISSIONS TAX
(,000)

GROSS CONCESSION REVENUES	1987										1997										2007
BASEBALL	9023	8677	8276	8684	9112	9561	10033	10527	11046	11591	12162	12762	13391	14051	14744	15471	16233	17034	17873	18755	19679
FOOTBALL	1954	2008	2041	2141	2247	2357	2474	2596	2724	2858	2999	3147	3302	3465	3635	3815	4003	4200	4407	4624	4852
BASKETBALL	1053	1056	1054	1106	1161	1218	1278	1341	1407	1477	1550	1626	1706	1790	1879	1971	2068	2170	2277	2390	2507
CONS. SHOWS	0	350	580	609	639	671	704	738	775	813	853	895	939	986	1034	1085	1139	1195	1254	1315	1380
OTHER	625	655	825	866	909	954	1001	1050	1102	1156	1213	1273	1335	1401	1470	1543	1619	1699	1782	1870	1963
TOTAL	12656	12748	12777	13407	14068	14761	15489	16252	17054	17894	18777	19702	20674	21693	22762	23884	25062	26297	27594	28954	30382
SALES TAX REVENUES																					
CONCESSIONS	127	127	128	134	141	148	155	163	171	179	188	197	207	217	228	239	251	263	276	290	304
ADMISSIONS TAX REVENUES																					
BASEBALL	900	825	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750	750
FOOTBALL	291	285	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276	276
BASKETBALL	226	216	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205	205
CONS. SHOWS	0	100	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158	158
OTHER	98	98	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
TOTAL	1514	1523	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506

1) Per capita expenditures on concessions taken from "Future of Candlestick Park" Study. Expenditures are inflated at 4.93 percent, the average annual compounded inflation rate for the San Francisco-Oakland SMSA, during the post World War II years. Expenditures were then multipled by attendance to get concession expenditure for each type of event.

2) Sales tax revenues were derived by multiplying total concession sales by the 1 percent sales tax.

3) Admission tax revenues are calculated by charging each attendee 50¢ for admission. This is a different assumption from the "Future of Candlestick Park" study which assumed tickets were taxed at a flat rate of 50¢ for tickets over $8.99

TABLE A-3
DOMED CANDLESTICK: ON-SITE
JOBS AND PAYROLLS
(,000)

	1987										1997										2007
JOBS																					
STADIUM EMPLOYEES	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
PAYROLLS																					
STADIUM EMPLOYEES	1751	1838	1928	2023	2123	2228	2338	2453	2574	2701	2834	2973	3120	3274	3435	3605	3782	3969	4164	4370	4585
PAYROLL TAXES	26	28	29	30	32	33	35	37	39	41	43	45	47	49	52	54	57	60	62	66	69

1) Number of stadium employees taken from "Future of Candlestick Park" Study. Not in (000's).

2) Salaries from "Future of Candlestick" study were adjusted to reflect inflation at 4.93 percent per year and multiplied by 1.194 percent for perks as in "Giants' Study".

3) Payroll taxed at 1.5 percent to get payroll tax revenues.

TABLE A-4
DOMED CANDLESTICK: ON-SITE
SUMMARY OF IMPACTS OF
ON-SITE EXPENDITURES
(,000)

	1987										1997										2007
SALES TAX	127	127	128	134	141	148	155	163	171	179	188	197	207	217	228	239	251	263	276	290	304
ADMISSIONS TAX	1514	1523	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506
NOI	4349	4443	4505	4727	4960	5204	5461	5730	6013	6309	6620	6946	7289	7648	8025	8421	8836	9272	9729	10208	10712
PAYROLL TAX	26	28	29	30	32	33	35	37	39	41	43	45	47	49	52	54	57	60	62	66	69
TOTAL	6015	6121	6167	6397	6638	6891	7156	7435	7727	8034	8356	8693	9048	9420	9810	10219	10649	11100	11573	12069	12590
JOBS(FTE)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
PAYROLLS	1751	1838	1928	2023	2123	2228	2338	2453	2574	2701	2834	2973	3120	3274	3435	3605	3782	3969	4164	4370	4585

1) NOI income was re-calculated including Giants' concession revenues, and dropping all revenues from Warriors. Also admission revenues were dropped since they are already included as a line item. All figures were inflated using 4.93 annual inflation.

TABLE B-1
DOMED CANDLESTICK: OFF-SITE
ESTIMATED ATTENDANCE AND CHARACTERISTICS
OF ATTENDANCE
(,000)

TOTAL ATTENDANCE	1987										1997										2007
BASEBALL	720	660	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
FOOTBALL	232	228	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220	220
BASKETBALL	180	172	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164	164
CONS SHOW	0	80	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126	126
OTHER	78	78	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94
TOTAL	1211	1218	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204	1204
NUMBER OVERNIGHT																					
BASEBALL	50	46	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42	42
FOOTBALL	23	23	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22
BASKETBALL	6	6	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
CONS SHOW	0	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
OTHER	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
TOTAL	82	80	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76

1) Attendance taken from projections in "Future of Candlestick Park" study. Basketball attendance omitted. Only 40 percent of total attendees were expected to spend money off-site.

2) Percentage of persons estimated to stay overnight by type of event: 7.0 for baseball, 10.7 for football, and 3.2 for consumer shows and others. Percentage figures taken from City of Minneapolis Stadium Site Task Force Study, 1979.

3) Basketball franchise is added in the attendance.

TABLE B-2
DOMED CANDLESTICK: OFF-SITE
ESTIMATED TOTAL EXPENDITURES
(,000)

PER CAPITA EXP.	1987										1997										2007
REST.	7.63	8	8	9	9	10	10	11	11	12	12	13	14	14	15	16	16	17	18	19	20
RETAIL	4.32	5	5	5	5	6	6	6	6	7	7	7	8	8	8	9	9	10	10	11	11
HOTEL	59.07	62	65	68	72	75	79	83	87	91	96	100	105	110	116	122	128	134	140	147	155
TOTAL	71.03	75	78	82	86	90	95	99	104	110	115	121	127	133	139	146	153	161	169	177	186
TOTAL EXPENDITURES																					
REST.	9241	9754	10121	10620	11143	11693	12269	12874	13509	14175	14874	15607	16376	17184	18031	18920	19852	20831	21858	22936	24067
RETAIL	5237	5527	5735	6018	6315	6626	6953	7295	7655	8032	8428	8844	9280	9737	10217	10721	11250	11804	12386	12997	13638
HOTEL	4839	4930	4964	5209	5466	5736	6018	6315	6626	6953	7296	7655	8033	8429	8844	9280	9738	10218	10722	11250	11805
TOTAL	19316	20212	20821	21847	22924	24054	25240	26484	27790	29160	30598	32106	33689	35350	37093	38921	40840	42854	44966	47183	49509

1) Hotel expenditures are average room rates for San Francisco.

2) Restaurant and hotel total expenditures derived by multiplying total attendance by per capita expenditures.

3) Overnight visitors figure was divided by 1.8 to obtain total roomnights. Total roomnights were then multiplied by the room rate to estimate total hotel expenditures.

4) Expenditures are inflated at 4.93 percent annually.

TABLE B-3
DOMED CANDLESTICK: OFF-SITE
ESTIMATED TOTAL EXPENDITURES *
(,000)

SALES TAX	1987										1997										2007
RESTURANT	92	98	101	106	111	117	123	129	135	142	149	156	164	172	180	189	199	208	219	229	241
RETAIL	52	55	57	60	63	66	70	73	77	80	84	88	93	97	102	107	112	118	124	130	136
HOTEL	472	481	484	508	533	559	587	616	646	678	711	746	783	822	862	905	949	996	1045	1097	1151
TOTAL	617	633	643	674	708	742	779	817	858	900	944	991	1040	1091	1145	1201	1260	1323	1388	1456	1528

1) Restaurant and retail total expenditures (see Table B-2) multiplied by one percent sales tax equals total sales tax.

2) Hotel expenditures multiplied by 9.75 percent hotel room tax equals total hotel room tax revenues.

TABLE B-4
DOMED CANDLESTICK: OFF-SITE
ESTIMATED JOBS AND PAYROLLS *
(,000)

AMOUNT OF EXPENDITURES TO LABOR-PAYROLLS	1987										1997										2007
RESTURANT	3160	3336	3461	3632	3811	3999	4196	4403	4620	4848	5087	5338	5601	5877	6167	6471	6790	7124	7476	7844	8231
RETAIL	733	774	803	843	884	928	973	1021	1072	1125	1180	1238	1299	1363	1430	1501	1575	1653	1734	1820	1909
HOTEL	1640	1671	1683	1766	1853	1944	2040	2141	2246	2357	2473	2595	2723	2857	2998	3146	3301	3464	3635	3814	4002
TOTAL	5534	5781	5947	6240	6548	6871	7210	7565	7938	8329	8740	9171	9623	10097	10595	11118	11666	12241	12844	13478	14142
OPERATING JOBS (FTE)																					
RESTURANT	376	378	392	411	432	453	475	499	523	549	576	605	634	666	698	733	769	807	847	888	932
RETAIL	56	56	58	61	64	67	71	74	78	82	86	90	94	99	104	109	114	120	126	132	139
HOTEL	133	129	130	137	143	150	158	165	174	182	191	201	210	221	232	243	255	268	281	295	309
TOTAL	564	563	580	609	639	671	704	738	775	813	853	895	939	985	1034	1085	1138	1195	1253	1315	1380

1) Percent of total expenditures to payrolls is 34.2 percent for restaurants, 14 percent for retail and 33.9 percent for hotels.

2) Average (FTE) salaries: taken from BLS: Restaurant = $8,414; retail = $13,137; Hotel = $12,329 (Table II-c). Wages inflated annually at 4.93 percent, assuming fully indexed wages. Not in (000's).

3) Average (FTE) salaries divided into payroll figure equals number of full time equivalent jobs.

TABLE B-5
DOMED CANDLESTICK: OFF-SITE
ESTIMATED PAYROLL TAX
(,000)

PAYROLL TAX	1987										1997										2007
RESTURANT	47	50	52	54	57	60	63	66	69	73	76	80	84	88	92	97	102	107	112	118	123
RETAIL	11	12	12	13	13	14	15	15	16	17	18	19	19	20	21	23	24	25	26	27	29
HOTEL	25	25	25	26	28	29	31	32	34	35	37	39	41	43	45	47	50	52	55	57	60
TOTAL	83	87	89	94	98	103	108	113	119	125	131	138	144	151	159	167	175	184	193	202	212

1) Businesses must pay either payroll taxes or gross business receipt taxes, whichever is higher. Since in all cases payroll taxes exceeded gross business receipts taxes, payroll taxes were used.

2) The amount of payrolls were multiplied by 1.5 percent (the payroll tax rate) to derive estimated payroll tax for each category.

TABLE B-6
DOMED CANDLESTICK: OFF-SITE
ESTIMATED NEW PROPERTY
TAX REVENUES
(,000)

CAPITALIZED VALUE OF NET RENTAL INC	1987										1997										2007
RESTURANT	10781	11380	11808	12390	13001	13642	14314	15020	15760	16537	17353	18208	19106	20048	21036	22073	23161	24303	25501	26758	28078
RETAIL	6284	6633	6882	7222	7578	7951	8343	8754	9186	9639	10114	10613	11136	11685	12261	12865	13500	14165	14864	15596	16365
HOTEL	20161	20541	20685	21705	22775	23898	25076	26312	27610	28971	30399	31898	33470	35120	36852	38669	40575	42575	44674	46877	49188
TOTAL	37226	38554	39375	41316	43353	45491	47733	50087	52556	55147	57866	60718	63712	66853	70149	73607	77236	81044	85039	89231	93631
NEW PROPERTY TAXES																					
RESTURANT	128	132	137	144	151	158	166	174	183	192	202	212	222	233	244	256	269	282	296	311	326
RETAIL	75	77	80	84	88	92	97	102	107	112	117	123	129	136	142	149	157	165	173	181	190
HOTEL	240	239	240	252	265	278	291	306	321	337	353	371	389	408	428	449	471	495	519	545	571
TOTAL	443	448	457	480	504	528	555	582	611	641	672	705	740	777	815	855	897	941	988	1037	1088

1) The triple net lease to owners of retail stores and restaurants, which is estimated to average to be 7.2 percent and 7.0 percent of gross receipts respectively, is capitalized at six percent.

2) Hotel income, expected to be approximately 25 percent of gross receipts, is also capitalized at six percent. (Assistant Chief Assessor).

3) The triple net retail lease income for restaurants and retail stores comes from the "Dollars and Cents of Shopping Centers, 1981", for the upper decile of U.S Super Regional Shopping Centers, which is "comparable to those of central business districts of a major metropolitan area."

4) The total capitalized value is multiplied by .0119 the property tax rate, taken from City and County of San Francisco, Annual Appropriation Ordinance, 1981-1982, to derive total property tax revenues.

5) Property tax revenues were calculated to reflect two percent increase in assessed value under Proposition 13 on 90 percent of the property, and an average appreciation rate of 2.93 percent above the two percent limit on the 10 percent of property that turns over annually. Thus: (.0293 + (.02 x .9) = .0473)

TABLE B-7
DOMED CANDLESTICK: OFF-SITE
TOTAL TAX REVENUES
(,000)

TAX REVENUES	1987										1997										2007
SALES TAX	617	633	643	674	708	742	779	817	858	900	944	991	1040	1091	1145	1201	1260	1323	1388	1456	1528
PAYROLL TAX	83	87	89	94	98	103	108	113	119	125	131	138	144	151	159	167	175	184	193	202	212
PROPERTY TAX	443	448	457	480	504	528	555	582	611	641	672	705	740	777	815	855	897	941	988	1037	1088
TOTAL TAXES	1143	1168	1189	1248	1309	1374	1442	1513	1587	1666	1748	1834	1924	2019	2119	2223	2333	2448	2568	2695	2828

TABLE D-1

[redacted] CANDLESTICK: CAMPEAU ALTERNATIVE

PROPERTY TAX REVENUE

(,000)

OFFICE	1988										1998										2008
AMOUNT OF DEVELOPMENT			267		267		267														
LEASE RATE $/SF NNN	0.00	0.00	28.01		30.84		33.96														
TOTAL LEASE REVENUE	0	0	7470		8224		9055														
PROPERTY VALUE @ 11% CAP RATE	0	0	67905	69263	145415	148323	233609	238281	243046	247907	252866	257923	263081	268343	273710	279184	284768	290463	296272	302198	308242
TAXES @ .0119%	0	0	808	824	1730	1765	2780	2836	2892	2950	3009	3069	3131	3193	3257	3322	3389	3457	3526	3596	3668
HOTEL																					
NUMBER OF ROOMS			400																		
TOTAL REVENUE			23190	24333	25533	26791	28112	29498	30953	32478	34080	35760	37523	39373	41314	43350	45488	47730	50083	52552	55143
TOTAL LEASE REVENUE NNN			5797	5913	6205	6511	6832	7169	7522	7893	8282	8690	9119	9568	10040	10535	11054	11599	12171	12771	13401
PROPERTY VALUE @ 6% CAP RATE	0	0	96624	98557	103416	108514	113864	119477	125368	131548	138033	144839	151979	159472	167334	175583	184239	193322	202857	212854	223348
TAXES @ .0119%	0	0	1150	1173	1231	1291	1355	1422	1492	1565	1643	1724	1809	1898	1991	2089	2192	2301	2414	2533	2658
RETAIL																					
AMOUNT OF DEVELOPMENT	0	0	50																		
GROSS RETAIL SALES	0	0	7856	8243	8649	9076	9523	9992	10485	11002	11544	12114	12711	13337	13995	14685	15409	16168	16966	17802	18680
LEASE REVENUE NNN	0	0	566	593	623	653	686	719	755	792	831	872	915	960	1008	1057	1109	1164	1222	1282	1345
PROPERTY VALUE @ 6% CAP RATE	0	0	9427	9615	9807	10004	10204	10408	10616	10828	11045	11266	11491	11721	11955	12194	12438	12687	12941	13200	13464
TAXES @.0119	0	0	112	114	117	119	121	124	126	129	131	134	137	139	142	145	148	151	154	157	160

TABLE D 1
DOMED CANDLESTICK: CAMPEAU ALTERNATIVE
PROPERTY TAX REVENUE
(,000)

HOUSING																						
AMOUNT OF DEVELOPMENT			167		167		166															
PROPERTY VALUED @ AVG PRICE OF $145k	0		203		224		246															
TOTAL PROPERTY VALUE	0	0	33847	35447	76298	79907	126728	132723	139000	145575	152461	159672	167225	175135	183418	192094	201180	210696	220662	231099	242030
TAXES @.0119	0	0	403	422	908	951	1508	1579	1654	1732	1814	1900	1990	2084	2183	2286	[illegible]	2507	2626	2750	2880
TOTAL TAXES	0	0	2473	2533	3986	4126	5764	5961	6165	6377	6597	6827	7066	7315	7573	7843	81[illegible]	8415	8719	9056	9766

1) Eight hundred thousand net square feet of office space phased in 267,000 square feet at a time in 1990, 1992, and 1994. The price per square foot is the same as for New Domed Stadium and Downtown Tables C.

2) four hundred hotel rooms at 70 percent occupancy at an estimated room rate of $85.00 multiplied by 2, for other expenditure equals total revenues. Total revenues are inflated at 4.93 percent.

3) 25 percent of total revenues for the final year inflated at two percent are capitalized at six percent, to derive the assessed value.

4) Fifty thousand square feet at the median retail store total sales per square foot of $157.00 equals gross revenues. Gross revenues are inflated at 4.93 percent.

5) Total lease revenue is estimated at seven percent of gross revenues equals triple net lease revenues, and are inflated at two percent to estimate assessed property value.

6) Assessed value or property estimated at 145,000 per houses and inflated at two percent. 145,000 dollar retail price price.

TABLE D-2
DOMED CANDLESTICK: CAMPEAU ALTERNATIVE
SALES TAX
(,000)

HOUSING																					
YEAR	1988										1998										2008
RESIDENTS	0		169		552		934														
ANNUAL EXPENDITURES ON TAXABLE ITEMS	10.69	11	12	12	13	13	14	14	15	16	16	17	18	18	19	20	1	22	23	24	25
TOTAL TAXABLE IN S.F	0	0	981	1023	3492	3642	6426	6703	6991	7291	7605	7932	8273	8629	9000	9387	[illegible]	10211	10651	11109	1158[illegible]
SALES TAX	0	0	10	10	35	36	64	67	70	73	76	79	83	86	90	94	[illegible]	102	107	111	116
RETAIL																					
SALES TAX	0	0	79	82	86	91	95	100	105	110	115	121	127	133	140	147	15[illegible]	162	170	178	187
TOTAL SALES TAX	0	0	88	93	121	127	159	167	175	183	191	200	210	220	230	241	25[illegible]	264	276	289	[illegible]

1) Residents estimated at 2.3 per household. Shows cumulative residents, which is maintained in perpetutity after 1994. Not in (000's).

2) Annual expenditures estiamted at $8,000 per resident in 1982 dollars. Sales reflect increase of 4.93 for inflation annually.

3) Sales tax are one percent total taxable sales.

4) Retail sales is one percent of gross revenues.

TABLE D-3
DOMED CANDLESTICK: CAMPEAU ALTERNATIVE
DEVELOPMENT, EMPLOYEES,
AND PAYROLLS
(,000)

OFFICE	1988										1998										[illegible]
AMOUNT OF DEVELOPMENT			267		267		267														
TOTAL EMPLOYEES	0		1067	1067	2133	2133	3200	3200	3200	3200	3200	3200	3200	3200	3200	3200	[illegible]	3200	[illegible]	[illegible]	[illegible]
TOTAL PAYROLLS	0	0	44728	46933	98691	103556	148036	155335	162993	171028	179460	188307	197591	207332	217553	228279	[illegible]	251342	[illegible]	[illegible]	[illegible]
PAYROLL TAX	0	0	671	704	1480	1553	2221	2330	2445	2565	2692	2825	2964	3110	3263	3424	[illegible]	3770	[illegible]	4151	[illegible]
HOTELS																					
TOTAL PAYROLLS			7861	8249	8656	9082	9530	10000	10493	11010	11553	12123	12720	13347	14005	14696	[illegible]	16181	[illegible]	17815	[illegible]
TOTAL EMPLOYEES			638	669	702	737	773	811	851	893	937	983	1032	1083	1136	1192	[illegible]	1312	[illegible]	1445	[illegible]
PAYROLL TAX			118	124	130	136	143	150	157	165	173	182	191	200	210	220	[illegible]	243	[illegible]	[illegible]	[illegible]
RETAIL																					
TOTAL PAYROLLS			1100	1154	1211	1271	1333	1399	1468	1540	1616	1696	1780	1867	1959	2056	[illegible]	2264	[illegible]	[illegible]	[illegible]
TOTAL EMPLOYEES			84	88	92	97	101	106	112	117	123	129	135	142	149	156	[illegible]	172	191	190	[illegible]
PAYROLL TAX	0	0	16	17	18	19	20	21	22	23	24	25	27	28	29	31	[illegible]	34	[illegible]	[illegible]	[illegible]
TOTAL PAYROLL TAX			805	845	1628	1709	2383	2501	2624	2754	2889	3032	3181	3338	3503	3675	[illegible]	4047	[illegible]	4456	[illegible]

1) Office employment is estimated the same as in Table C.

2) Hotel and retail employment payroll and payroll taxes

TABLE D-4
DOMED CANDLESTICK: CAMPEAU ALTERNATIVE
ECONOMIC IMPACTS FROM UNUSED SITE
(,000)

TAX REVENUES

YEAR	1988										1998										[illegible]
SALES TAX	0	0	88	93	121	127	159	167	175	183	191	200	210	220	230	241	[illegible]	264	276	289	[illegible]
PROPERTY TAX	0	0	2473	2533	3986	4126	5764	5961	6165	6377	6597	6827	7066	7315	7573	7843	[illegible]	8415	8719	9036	[illegible]
PAYROLL TAX	0	0	805	845	1628	1709	2383	2501	2624	2754	2889	3032	3181	3338	3503	3675	[illegible]	4047	[illegible]	4456	[illegible]
TOTAL TAX REVENUES	0	0	3367	3471	5736	5962	8307	8629	8964	9313	9678	10059	10457	10872	11306	11759	[illegible]	12726	[illegible]	13781	[illegible]
JOBS	0		1788	1824	2928	2967	4074	4118	4163	4210	4260	4312	4367	4425	4485	4548	[illegible]	4685	4758	[illegible]	[illegible]
PAYROLLS	0	0	44728	46933	98691	103556	148036	155335	162993	171028	179460	188307	197591	207332	217553	228279	[illegible]	251342	[illegible]	[illegible]	[illegible]

TABLE C-1
DOMED CANDLESTICK:UNUSED-SITE
PROPERTY TAX REVENUES
(,000)

OFFICE	1986										1996										2006
AMOUNT OF DEVELOPMENT	667		667		667																
LEASE RATE $/SF NNN	34.66		38.16		42.02																
TOTAL LEASE REVENUE	23106		25441		28011																
PROPERTY VALUE @ 11% CAP RATE	210057	214258	449822	458818	722639	737092	751834	766871	782208	797852	813809	830085	846687	863621	880893	898511	916481	934811	953507	972577	992029
TAXES @ . 0119%	2500	2550	5353	5460	8599	8771	8947	9126	9308	9494	9684	9878	10076	10277	10483	10692	10906	11124	11347	11574	11805

1) Total lease revenue is the product of lease rate per square foot and amount of square feet of development.

2) Total lease revenue was capitallized at 11 percent rate, then inflated at 1.02 percent, the allowable rate under Proposition 13 to estimate Capitalized property value. Turnover factor was not calculated.

3) The total amount of development of 2 million of development is phased in one-third at a time, in 1986, 1988, and 1990.

4) The total capitalized value of office space is add in each period in which new development is finished, and inflated

TABLE C-2
DOMED CANDLESTICK:UNUSED-SITE
DEVELOPMENT,EMPLOYEES
AND PAYROLLS
(,000)

OFFICE	1986										1996
AMOUNT OF DEVELOPMENT	667		667		667						
TOTAL EMPLOYEES	3		5		8						
TOTAL PAYROLLS	92425	96981	203525	213559	336131	352703	370091	388336	407481	427570	448649
PAYROLL TAX	1386	1455	3053	3203	5042	5291	5551	5825	6112	6414	6730

OFFICE										2006
AMOUNT OF DEVELOPMENT										
TOTAL EMPLOYEES										
TOTAL PAYROLLS	470768	493977	518330	543883	570697	598832	628354	659332	691837	725945
PAYROLL TAX	7062	7410	7775	8158	8560	8982	9425	9890	10378	10899

1) Total employees is the cumulative number of employees. the final number of 8,000 is maintained in perpetutity.

2) Total office employees is derived from an estimated one employee per 250 square feet of office space.

3) Total payroll is the number of employees multiplied by an average salary of $30,000.

4) Payroll tax is 1.5 percent of total payrolls.

TABLE C-3
DOMED CANDLESTICK:UNUSED-SITE
ECONOMIC IMPACTS OF
UNUSED SITE
(,000)

TAX REVENUES

YEAR	1986										1996										2006
PROPERTY TAX	2500	2550	5353	5460	8599	8771	8947	9126	9308	9494	9684	9878	10076	10277	10483	10692	10906	11124	11347	11574	11805
PAYROLL TAX	1386	1455	3053	3203	5042	5291	5551	5825	6112	6414	6730	7062	7410	7775	8158	8560	8982	9425	9890	10378	10889
TOTAL TAX REVENUES	3886	4004	8406	8663	13641	14062	14498	14951	15420	15908	16414	16940	17485	18052	18641	19253	19889	20550	21237	21951	22694
JOBS	3		5		8																
PAYROLLS	92425	96981	203525	213559	336131	352703	370091	388336	407481	427570	448649	470768	493977	518330	543883	570697	598832	628354	659332	691837	725945

This factor of 40 percent of expenditures in San Fransico is a judgment of the consultants and is based upon the following considerations:

1. Candlestick is on the southern boundary of San Francisco and approximately 50 percent of all attendees at stadium events live south of San Francisco.

2. There are very limited opportunities to spend money in the immediate area of Candlestick Park.

3. A very small percent of attendees at Candlestick Park currently arrives by charter bus, and this limits the opportunities to encourage off-site expenditures at nearby collection points where buses may meet groups of attendees both before and after events.

Based on the analysis and assumptions discussed above, Table B-3 presents estimates of the sales tax revenues which will be generated by the off-site expenditures of attendees at a Candlestick stadium.

Table B-6 shows capitalized values of net rental income from the major recipients of off-site projected expenditures. These capitalized assessed values are then taxed at the current property tax rate. This method accounts for property taxes which will result from all off-site expenditures. Therefore it is not necessary to estimate "induced" new development near the stadium for purposes of calculating tax revenue benefits. However, in a subsequent subsection of this report, the phenomenon of "induced" new development is discussed further.

Impacts from Commercial Development with the Stadium

Tables D-1 through D-4 present a similar analysis for an alternative whereby commercial development is combined with a stadium on the Candlestick Park site. These tables present the amount of development, the expenditures which would be generated, the jobs and payrolls which would result and an estimate of new property tax revenues for the commercial component of this alternative.

Impacts from Development of the Unused Site

For the alternative of developing a stadium on Candlestick Park (as well as a subsequent analysis of a new domed stadium) some of the most important economic benefits will be those derived from the use of the alternative site which is not used for a stadium. Tables C-1 through C-3 present an analysis of the economic impacts from developing the unused site, if a new or domed stadium is developed at Candlestick Park. Table C-1 first estimates the amount of development over a phased period for this unused site (in downtown) then estimates its property tax revenue based upon a capitalization of the lease

revenues. Table C-2 presents an estimate of total employees generated by the development on the unused site. Table C-3 summarizes the property tax revenues and payroll tax revenues, as well as jobs and payrolls, which will be generated by commercial development on the unused site in downtown.

Induced Development

Induced development as presented in this analysis is not actually an additional economic impact. All of the economic impacts which will result from expenditures off-site have already been accounted for in the previous discussions. For purposes of this study "induced" new development simply represents a judgment as to how much of the expenditures which occur off-site will require new development to accommodate these expenditures. This is a very difficult and judgmental question to answer. In order to provide useful information on this subject, ERA conducted detailed case study analyses of other cities. This information is summarized below.

Cincinnati: Taft Riverfront Stadium

In 1970 the Cincinnati Chamber of Commerce reported the direct economic impact of Riverfront Stadium exceeded $20 million. Accounting for inflation in 1982 this figure would be upwards of $54 million. Furthermore this impact was generated solely by the Reds.

Of the $20 million, fans spent approximately $8.5 million on food, $3 million on lodging, $2 to 2.5 million on transportation, $1 million on amusement and recreation, and $3.5 million on shopping and other purchases.

As a result of Riverfront Stadium, and the adjacent Riverfront Coliseum, the Stouffer Inn in Cincinnati has expanded, as has the Hilton Netherland Inn. Also, a Westin International Hotel, and high-rise budget hotel, which is next to the Stadium, are being built. While this spin-off development in not totally attributable to the Stadium, the viability of these hotels woould be doubtful if the stadium did not exist.

Pittsburgh: Three Rivers Stadium

Expenditures for meals, entertainment, hotels, and parking by Pittsburgh's football and baseball fans were $8,154,926 (1979 dollars) and $6,448,795 (1981 dollars), respectively. Ticket and concession sales accounted for an additional $4,961,348 by Pirates fans, and $2,187,500 by Steelers fans. Thus, total direct fan expenditures were $13,116,326 by Pirates fans and $11,834,795 by Steelers fans.

Per capita expenditures off-site were $5.00 on food and entertainment, $0.79 in hotels and $0.60 on parking[1]. This

[1]Adjust Steeler per capita expenditures by 25 percent for inflation.

assumes total annual attendees were 1,630,318 for Pirates games and approximately 535,000 for Steelers games.

Induced or spin-off development has resulted in the Stadium Hilton being built adjacent to the stadium. Abbot Dairy has also built a facility since the stadium was constructed.

New Orleans: The Superdome

When at full operating levels the Superdome is expected to generate $25 to $27 million in direct expenditures ny non-residents[2].

Since the Superdome began construction 16 hotels, or 7,222 hotel rooms have been built. While not all of these are attributable to the Superdome, without a doubt the 1,252-room Hyatt Regency and the 176-room Holiday Inn in the Superdome area can be.

Office and hotel spin-off development includes the Hyatt Regency's two level retail concourse and the AMCO Oil Building. In addition, an apartment and office complex are being proposed.

Minneapolis: The Hubert Humphrey Metrodrome

Direct expenditures in Minneapolis are expected to be $16.8 million by sports fans and approximately $30 million ($27.2 million in 1977 dollars) by convention, exhibition and special events attendees. The convention, exhibition and special event attendees spand an average of $96.00 per event as sports fans spend an average $5.00 per game--accounting for the difference in their total expenditure.

Direct expenditures are expected to support the development of 500 hotel rooms, 54,000 square feet of restaurant space and 12,000 square feet of retail space. Through indirect expenditures, 35,000 square feet of office space and 125 rental units are expected to be built by 1982.

St. Louis: Busch Memorial Stadium

Impacts of Busch Memorial Stadium on the surrounding area is significant.[3] The area originally was a rundown warehouse district. Now with construction of Busch Memorial Stadium four hotels, which have 250 to 400 rooms each, four large office buildings, and four parking garages have been built.

The impact of the Stadium is shown by the fact that while tax

[2]Source: Evaluation of Superdome Operation; Arthur D. Little Inc. April 29, 1976/RERC Minneapois Report.
[3]No reports of the direct impacts of fan expenditures have been done for St. Louis.

breaks were given to these properties to build in the surrounding area, tax revenues from the land and parking garages have exceeded those when it was a warehouse district.

Seattle: The Kingdome

Total direct expenditures in 1979 as a result of the Kingdome were $72 million. This includes ticket revenues non-ticket revenues, such as advertising and television contracts, and attendee expenditures on travel, concession, hotels and restaurants. Of the total, $27 million was new spending by attendees from out of the county, who would have not come otherwise, and in-county residents, who would have spent their money out of county.

Total direct expenditures off-site (hotel, restaurants, entertainment, and retail), by all attendees of football, baseball, thrill shows, and other sports and consumer shows was $22,744,624. This figure is comparable to the one we have derived for the San Francisco Stadium Study.

Induced development such as hotels and office space can only be guessed. There are two noteworthy quotes reagarding the impact of the Kingdome on the surrounding real estate: " there has been an increase in new business in the area and a decrease in vacancies"; "the affects that managers perceived were primarily related to an increase in property taxes and rent which they attributed to the Kingdome. Based on their criteria, the Kingdome has affected property values to the extent that it resulted in increased income to the area."

Those two quotes together lead us to believe that fan expenditures have induced businesses to come to the area, thus raising land values and taxes. This led to actual development once the vacancy rate declined to the point that additional space was necessary.

Summary of Case Studies

The development which was induced in downtown areas as a result of stadium construction is summarized in Table 4. As can be seen in this table the amount of new physical development in proximity to new downtown stadiums has ranged from major redevelopment (hotels, office, apartments) in New Orleans to limited development in Pittsburgh.

Estimating the amount of new physical development near a major new downtown stadium is difficult. This is so because of the numerous unique factors which would affect this development in each city. However, those general factors which are most important appear to be:

- the availability of excess vacant land,
- the central location of the stadium within the downtown area,

Table 4

SUMMARY OF INDUCED DEVELOPMENT IN CITIES WITH DOWNTOWN STADIUMS

City/Pro Sports	Total Annual Expenditures	Probable Induced Development	Comments
Cincinnati:[1]			
Baseball	$20 Million	Expanded: Stouffer Inn, Hilton Netherland Inn. Built: Westin International Budget high-rise hotel	Baseball impacts only 1970 dollars would be close to 54 million today.
Pittsburgh:[2]			
Baseball	$13,116,326	Stadium Hilton	1979 Dollars - 25% Adjustment for Inflation would bring figure up to 1982 Dollars.
Football	$11,834,795		
New Orleans:[3]			
Football	$25-27 million	Indirectly: 16 hotels, or 7,222 rooms Directly: 1,252-room Hyatt Regency, 176-room Holiday Inn at Superdome AMCO Oil Building Proposed: Apartment Building, Office Complex	Indirect induced development is only partially attributable to Superdome. Expenditures were not categorized with respect to baseball.

[1] Economic Impact of Riverfront Stadium on Cincinnati area; Cincinnati Chamber of Commerce.
[2] Pirate's Economic Impact on Pittsburgh, 1980; Update of study for Chamber of Commerce: Regional Economic Impact Analysis, Pittsburgh Steelers; Department of City Planning, Pittsburgh, July 16, 1982.
[3] The Stadium Industry, Its economic and related impacts, prepared for: City of Minneapolis Stadium Site Task Force.

Table 4
(continued)

City/Pro Sports	Total Annual Expenditures	Probable Induced Development	Comments
Minneapolis:[4]			
	$16 million sports $30 million Conventions and Special Events	Supportable Development: 500 Hotel rooms 1,200 square feet of restaurant space 35,000 square feet of office space 125 rental units	Sports not cateogrized
St. Louis[3]			
	N.A.	Built: four hotels 250 to 400 rooms each Four large office buildings Four parking garages	
Seattle[5]			
	$72,313,238	N.A.	1979 Dollars assessed value of nearby property has risen over and above inflation as a result of the Kingdome

[4] Economic and Related Impacts of the Stadium Development Alternatives Facing the Twin Cities Metropolitan Area.
[5] Kingdome Impact Study, 1979; Prepared for: King County, Washington.
N.A. means Not Available.

- o the attractiveness of a downtown area and the tendency for suburban residents to spend time in that downtown area.

- o The willingness of the city to take an active role to encourage new development by re-zoning, density bonuses, land availability. etc.

- o The design of the stadium to allow easy access by pedestrian and vehicles into nearby commercial areas.

All of these factors tend to favor new induced development around a downtown stadium within San Francisco. However, with the Candlestick alternatives, the maximum potential nearby new development will be less than for the downtown alternative by approximately 40 percent due to the lower capture rate by San Francisco of off-site expenditures.

Furthermore the area around Candlestick is not an area where visitors normally spend money. With the domed Candlestick plus development alternatives, this could be somewhat altered, but the benefits of this new development have already been accounted for.

Summary of Economic Impacts from Development of a Stadium at Candlestick Park Site

All of the economic impacts discussed above are summarized in Table 5. This table focuses upon the year 1994 in evaluating impacts. In the comparative analysis presented later in this report the economic impacts from developing a stadium at Candlestick are evaluated year by year in terms of their net present value. As can be seen in Table 5, and as would be expected, a stadium plus development at Candlestick has more economic benefits than just a stadium at the site.

Table 5

SUMMARY OF ECONOMIC IMPACTS
FROM A STADIUM AT CANDLESTICK SITE
(Millions of $ - 1994)

	Stadium Only	Stadium plus Development
Direct		
A. From Stadium Operations		
Taxes (payrolls; concessions)	$.200	$.200
NOI	$5.730	5.730
Admissions Tax	$1.510	$1.510
Total City Revenues	$7.440	$7.440
Expenditures	$16.252	$16.252
Jobs (FTE)	50	50
Payrolls	$2.453	$2.453
B. In Nearby Area		
Taxes	$1.513	$1.513
Expenditures	$26.484	$26.484
Jobs (FTE)	817	817
Payrolls	$7.565	$7.565
Total for San Francisco		
Taxes	$3.223	$3.223
NOI	$5.730	$5.730
Expenditures	$42.736	$42.736
Jobs (FTE)	867	867
Payrolls	$10.018	$10.018
Indirect		
C. At Unused Site		
Taxes[1]	$15.420	$15.420
Expenditures	0	0
Jobs (FTE)	8,000	8,000
Payrolls	$407.481	$407.481
D. Development On-site		
Taxes[1]	N.A.	$8.307
Expenditures	N.A.	$6.426
Jobs (FTE)	N.A.	4074
Payrolls	N.A.	$148.036
Total for San Francisco - 1994		
Revenues to City	$15.420	$23.727
Expenditures	0	$6.426
Job (FTE)	8,699	12,773
Payrolls	$407.481	$555.517

[1]Based on taxable expenditures in San Francisco by on-site residents.
N.A. means not applicable.
Source: Economics Researsch Associates

6. FINANCING

A. SCOPE

The scope of this task is to analyze alternative methods of financing and to develop a comparison of the relative costs and benefits of each and the risks and financial exposure of the City attributable to them.

B. DATA

The cost data used in the analysis was provided by Barton-Malow and Williams and Burrows, Inc., as verified and escalated by Lee Saylor, Inc. Alternative methods of financing have been selected from among those used by San Francisco in the past and those utilized by political subdivisions throughout the country or suggested by investment banking firms as being in compliance with existing Internal Revenue Service regulations and rulings and appropriate under the circumstances. Included in the latter category are reports to the San Francisco Giants as indicated below:

Reports:

1. Analysis of Financing Methods for San Francisco Sports Stadium. Salomon Brothers, Inc July 1982

2. San Francisco Giants Financial Analysis for Proposed Stadium. Smith, Barney, Harris, Upham and Co., Incorporated, February 25, 1983 (Revised March 23, 1983).

3. San Francisco Stadium Project. Kidder, Peabody & Co., Incorporated, April 16, 1983.

4. Letter from Merrill Lynch Leasing, Inc. on proposed lease financing for a new Sports Stadium in San Francisco, April 29, 1983.

5. ..."proposed financing of a new sports complex or the doming of Candlestick Park". A proposal from Shearson/American Express, Inc., May 3, 1983.

Interviews:

1. Gordon Swanson, Vice President, Eastdil Realty, May 1983.

C. ALTERNATIVES

Five financing alternatives have been analyzed as affording the opportunity to implement, in whole or in part, any decision by the City to refurbish Candlestick Park. These alternatives include traditional techniques which usually provide 100% tax-exempt debt financing as well as more esoteric forms which involve private sector participation. These alternatives are described below.

Alternative 1: Lease Revenue Bonds

This financing technique was used for Candlestick Park (through San Francisco Stadium, Inc.) and for the Moscone Convention Center (through the Redevelopment Agency). This type of financing must be approved by a majority of the voters under the Charter. Bonds would be issued by the Redevelopment Agency or a non-profit corporation. Debt service for the bonds would be lease payments by the City from its General Fund. Bond proceeds would be used to finance debt service during construction.

Alternative 2: Private Sector Ownership

Under this alternative a major corporation would own and operate the stadium. The City would issue lease revenue bonds to provide for the project costs, but the owner would be primarily responsible for payment of bond debt service. It may even be possible to arrange the transaction so that the owner would not only contribute equity toward the project cost but would be exclusively responsible for debt service and the City would have no liability for the bonds. The owner would receive the tax benefits of ownership (depreciation, interest deduction and investment credit), as well as the public relations value of ownership, and as owner would receive any operating profits from the stadium. The City would hold an option to purchase the stadium for a nominal sum at a distant date. This type of financing must be approved by a majority of the voters under the Charter.

Conventional mortgage financing would also be available to the private sector owner but would cost more than the use of lease revenue or industrial development bonds.

Alternative 3: Sale-Leaseback Financing

This technique involves the sale or transfer of tax benefits (depreciation and interest), which cannot be used by the City, to the private sector which can use such benefits to shelter income. The City would operate the stadium under

this alternative. This type of financing must be approved by a majority of the voters under the Charter.

The City would purchase the facility at expiration of the lease term at its then fair market value.

The sale-leaseback alternative is a highly complex and technical undertaking involving substantial tax and securities laws questions. This is a rapidly evolving area and tax laws, Internal Revenue Service rulings or governing case law could be changed at any time and preclude consummation of such a transaction.

The City's participation in a financing of this type would typically involve issuance of tax-exempt bonds, such as lease revenue bonds described earlier, in such an amount as would, together with the proceeds from the sale of the tax benefits, equal construction and financing costs. The sale of tax benefits, often called the equity contribution, can be expected to reduce project costs by approximately 20% or so, depending upon the structure.

Alternative 4: Community Facilities District Financing

With passage of Proposition 13, the authorization of new general obligation bonds has effectively been precluded. However, recent legislation, the Mello-Roos Community Facilities Act of 1982 (Section 5311 et. seq. of the Government Code), seemingly would permit financing of Candlestick Park improvements with bonds payable from a special tax imposed on other than an ad valorem basis if approved by two-thirds of the voters within the confines of the Community Facilities District.

Alternative 5: Tax Allocation Bonds

If the site of Candlestick Park were to be annexed to an existing redevelopment project or lie within an area to be so designated, tax allocation bonds could be issued to pay all or a portion of financing costs. Such bonds, used by the City to finance the Davis Street BART Station, are payable from taxes collected upon the increase in assessed valuation within the redevelopment project area over the base year assessed valuation of the project area which is determined upon creation of the project.

D. ANALYSIS

The financing of improvements to Candlestick Park by either the City or the private sector will depend in large measure upon the benefits perceived to be derived from such activity. If projected revenues are adequate to meet operating expenses, financing costs and provide a return on investment, both the City and the private sector probably would willingly participate in the ownership role.

A stadium, looked upon from the standpoint of a free-standing project, usually does not produce sufficient revenues from rentals, ticket surcharges and concession income to be self-supporting. Only when indirect revenues such as hotel taxes, sales taxes, parking fees and property taxes from induced development are included do most stadiums appear self-supporting.

Accordingly, the use of conventional revenue bonds, such as those issued by the City to finance expansion at San Francisco International Airport, is not feasible because revenues from the stadium do not appear adequate to cover debt service.

Lease revenue bonds commit moneys in the City's General Fund to cover the shortfall in revenues. Alternatively, private sector ownership and sale-leaseback financing utilize private sector capital and federal tax benefits to cover the projected shortfall in revenues. Tax allocation bonds commit increases in property taxes to cover the shortfall while a Community Facilities District issue would use a special tax for this purpose.

The sale or lease of luxury boxes may further reduce construction costs. This technique has been employed elsewhere with success. The details of such a plan, whether it be to lease or to condominiumize the boxes, would have to be worked out with the principal tenants since ticket or admission charges presumably would be in addition to the box cost. Because of the limited number of boxes suitable for such treatment, the sale or lease thereof would not of itself dictate the financing alternative to be utilized. Rather, any decision to pursue this technique would probably be compatible with any of the financing techniques available. Similarly, the sale of debt obligations coupled with an option to acquire season tickets for athletic events may help to reduce financing costs but cannot be expected to produce adequate funds to supplant other alternatives.

Although it might be difficult to obtain a favorable two-thirds vote on issuance of bonds supported by a special tax in order

to expand Candlestick Park, the Community Facilities District Act affords an opportunity to raise funds with a broader base than just the direct and indirect revenues from Candlestick Park presently available to the City. Depending upon the geographical limits of the District and the basis for imposition of the special tax, significant relief could be provided to the City's General Fund.

The use of tax allocation bonds to finance public improvements within California has been widely accepted for many years. Its application, however, is limited to those redevelopment project areas where substantial private sector development has occurred or is occurring causing increases in assessed valuation sufficient to produce tax revenues in amounts capable of servicing the indebtedness incurred. In the case of Candlestick Park, it is doubtful that the entire financing requirements of the proposed improvements could be raised in this manner, but should Candlestick Park be included within a redevelopment project area, this financing technique affords the opportunity to raise funds payable from property taxes collected upon any increase in assessed valuation within the redevelopment project area. Through a reimbursement agreement between the City and the Redevelopment Agency, such tax revenues might also be used to reimburse the City for any lease rental payments made to support lease revenue bonds issued by the Redevelopment Agency for Candlestick Park improvements.

Total financing costs for each of the alternatives involving City participation include estimated design and administration costs at 15% of construction expense, construction, costs of bond issuance, funded interest during the construction period and establishment of a reserve for debt service as appropriate, and provision for a discount bid or debt service insurance as indicated. The period for which interest is funded is dependent upon the time frame from commencement of construction to completion thereof. Alternative construction schedules have been provided involving the design/bid/build process and a phased design/bid/build scenario. The latter should result in a completed facility considerably sooner than the more conventional design/bid/build process but poses more difficult financing considerations such as the imposition of liquidated damages for failure to complete in a timely manner, provision of labor and material and performance bonds and certainty as to costs at the time the bond issue is sized.

The Task Force Team has studied several design alternatives for improvements to Candlestick Park and the cost of Schemes 7 and 8, which are identical, have been selected to illustrate the probable costs for the financing methods described above. The estimated construction cost of $56.1 million has been escalated 5.3% to a June 1984 figure resulting in an estimated construction cost of $59.0 million. Shown in the table following are the estimated bond issue sizes required to finance this cost assuming a 9.5% borrowing rate for 25-year lease revenue bonds and a 9% rate for a Community Facilities District offering.

Interest is funded for a period of 36 months for the lease revenue bond issue on the assumption that bonds would not be sold until either the fixed cost or maximum cost of construction is determined (either 15 months or 5 months from the order to proceed depending upon whether the design/bid/build or the phased design/bid/build process is utilized). A debt service reserve equal to maximum annual debt service is also provided. Because the City cannot legally commence rental payments until the improvements are substantially completed and it has the beneficial use of them, it is necessary to fund interest during the construction period for lease revenue bonds. For the Community Facilities District issue, however, the special tax could be imposed immediately so only a reserve fund is provided to cover cash flow concerns. Recent Internal Revenue Service letter rulings require that investment income during the construction period be taken into account in sizing the respective bond issues. This has been done at rates varying from 8% to 10.5% depending upon the particular funds invested. In the absence of tax revenues adequate to support a tax allocation bond issue for the cost of Candlestick Park Improvements, no issue size has been calculated for this financing method.

(in thousands)

Item	Lease Revenue Bonds	Sale-Leaseback	Community Facilities District
Construction cost	$59,000	$59,000	$59,000
Design & administration	8,850	8,850	8,850
Sub-total	$67,850	$67,850	$67,850
Less:			
Investment income	14,658	11,731	10,146
Equity contribution (20%)	--	13,570	--
Sub-total	$53,192	$42,549	$57,704
Funded interest (3 years)	26,334	21,090	--
Bond reserve fund	9,794	7,844	6,790
Discount/issuance (3%)	2,772	2,220	2,001
Issuance expense	250	250	200
Bond issue size (rounded)	$92,400	$74,000	$66,700

The annual debt service requirements for each issue are the same as the amount of the bond reserve fund deposit.

For the 25-year period of debt service payments, the City's aggregate obligation for each of these alternatives is calculated to be as follows, assuming application of the reserve fund to the final payment:

Lease Revenue Bonds	$235,056,000
Sale-Leaseback	$188,256,000
Community Facilities District	$162,960,000

Any financing of additional improvements to Candlestick Park is assumed to be able to comply with existing restrictions and covenants made for the protection of present holders of San Francisco Stadium, Inc. bonds (a lease obligation of the City) and no refunding or refinancing of such indebtedness is contemplated in the examples given.

The relative advantages and disadvantages of the financing alternatives are summarized in the comparisons which follow:

Advantages	Disadvantages
1. Lease Revenue Bonds	
A. Require only a simple majority vote of the electorate	A. Must fund interest during construction, increasing issue size
B. Can be additional bonds to existing San Francisco Stadium, Inc. financing, reducing time and complexities of issuance	B. May pose Proposition 4 appropriations limit problem
	C. City is solely at risk for debt service
	D. Should have construction bids in hand to size issue, determine rent
2. Private Sector Ownership	
A. Requires only a simple majority of the electorate	B. Private owners may be difficult to locate
B. Affords reduction and possible elimination of financial exposure of the City	

Advantages	Disadvantages
3. Sale-Leaseback Financing	
A. Requires only a simple majority vote of the electorate	A. Complex tax and legal process
B. Affords some reduction in financial exposure of the City because of equity contributions	B. Lower than usual assurance of success
4. Community Facilities District	
A. Least costly method	A. Requires two-thirds vote of District electorate
B. Broadens base of revenue support	B. May require court validation action because of newness of statute
5. Tax Allocation Bonds	
A. No vote required, only Board of Supervisors/Redevelopment Agency approval	A. Needs substantial private sector investment to produce requisite increase in assessed valuation

7. PUBLIC OPINION

A. SCOPE

Included in this study is the identification of the questions, concerns, doubts and potential support and/or opposition to the doming and revitalization of Candlestick Park, or to alternate land use schemes for the site, should a new stadium be built downtown.

The methods used to collect this information were secondary data analysis and interview methods. Secondary data analysis includes the analysis of existing studies, press clippings and letters to concerned parties or individuals. Interviews with community leaders were conducted to complete a profile of public attitudes toward the proposed project. This mix of qualitative and quantitative data does not represent the same kind of results which would be obtained by a public opinion survey, but allows us to identify attitudes, values and perceptions of a variety of publics. This information should provide the City with an insight into the opinions of key community leaders and organizations.

B. DATA

COMMUNITY LEADERS

Through response from requests made to the Board of Supervisors, a review of past City files on Candlestick Park and analysis of newspaper articles, 13 community leaders or organizations in the Bayview-Hunters Point and Visitacion Valley neighborhoods were identified as being vocal, influential and concerned about the impact of the stadium on their neighborhood. All were contacted and offered the opportunity to provide input to the study. Seven of the 13 responded and were interviewed.

Mr. Edwin J. Terry
Ad Hoc Committee on
Jamestown Avenue

Joyce Hall
Visitacion Valley
Improvement Association

Fr. Benvenito Bravero
St. Paul of the Shipwreck Church

Henry Shindell
Visitacion Valley Improvement Association

Julie Cavanaugh
Visitacion Valley Community Center

Shirley Jones
Bayview-Hunters Point Coordinating Council

Harold Madison
Shafter Avenue Club

In the interviews the respondents were asked for comments in three broad areas:

1. What do you perceive to be the current problems associated with Candlestick Park?

2. What do you perceive the community's attitude would be toward the doming and upgrading of Candlestick Park?

3. What alternate uses of the Candlestick Park site do you think would benefit the neighborhood, and receive community support?

<u>Current Problems</u>

Responses to question one fell into seven broad categories. The problems most frequently mentioned are listed below in order of perceived importance.

- Traffic/Transit/Parking
- Littering/Destructiveness/Disrespect and abuse to the neighborhood and residents on the part of sports fans
- Negative impact on local businesses
- Crime
- Failure by the Giant's organization to respond to the neighborhood's problems
- City's neglect of the facility
- Stadium has encouraged deterioration of neighborhood and property values.

The last four received equal mention.

By a large margin, the impact of Candlestick Park which most concerns these community leaders is that of Traffic/Transit/

Parking. When mentioned, it was always prefaced as being the "Number 1", "major", or "only problem". This category includes mentions of traffic created safety hazards; blocking of emergency access routes; limited access to private homes; elimination of street parking; noise and air pollution caused by cars and buses; need to plan or rearrange community and church activities around game schedules; and the basic violation of homeowner rights. More than one respondent mentioned the feeling that neighborhood residents are "hostages" during game times.

The category of next concern for neighborhood residents is fan behavior. A common mention is that fans treat the neighborhood as if it was an adjunct to the park itself. This category includes mentions of littering; the City's failure to provide post-game cleanup of the neighborhood, verbal abuse and harassment of residents by drunken fans and tailgate parties on private property. When mentioned, respondents were evenly divided as to whether baseball or football fans were "rowdier".

Some respondents specifically mentioned that the park had a negative impact on local business. However other respondents mentioned that the impact on local business was negligible since the neighborhood has little service oriented business that fans might patronize. The negative impact mentioned was that due to heavy traffic, residents did not patronize local business, thus causing losses during game times. One respondent mentioned that the local neighborhood businesses could do more to promote patronization by fans.

Receiving one mention each were Crime; the Giant's organization failure to respond to stadium related problems; the City's neglect of the facility and the perception that the stadium has contributed to the deterioration of the neighborhood property values.

Improve Candlestick Park

Responses to question number two were all similar. All seven respondents believe that before any improvements are made to the park itself the Traffic/Transit/Parking problem must be solved. All of the respondents were familiar with the City's 1981 "Report on Candlestick Park Access". One respondent said the City had made some improvements since that time, the others felt that nothing had been done to solve the problem. Two of the respondents would oppose doming or any other improvements to the park unless all game or event traffic were removed from residential streets. One respondent was also opposed to improvements if it would mean continuous or near daily use of the facility for events such as rock concerts which could bring an "unknown, potentially harmful" element to the community.

The other 5 respondents all felt that solving the Traffic/ Transit/Parking problem and making improvements to the Stadium, including a dome, would not only answer the City's concerns about a stadium but would make the park an asset to the community. This sentiment was often mentioned in conjunction with current attempts at revitalization of the neighborhood including Executive Park, a proposed Southern Pacific Development and the Stadium's proximity to Candlestick State Park.

The respondents felt that once existing problems were solved, their community would best be served by doming and upgrading the facility.

Alternate Uses

Responses to alternative land use of the Candlestick Park site were varied, but had "people oriented" uses as a commonality. With the exception of one respondent, all felt that the addition of housing and businesses would benefit the community. One respondent had no definite thoughts about an alternate use, but felt that the area had enough homes and that developments such as Executive Park supplied adequate business expansion -- the respondent was especially opposed to the addition of low income housing.

The desired residential alternative is a mix of low and moderate income housing; apartment units for singles, affordable family homes which could be purchased and separate senior housing. Many respondents mentioned a definite opposition to luxury condominiums on the site. The key word on housing was "affordable".

The business alternative most mentioned was "service" oriented businesses. All respondents mentioned that the area has a definite lack of retail shops, restaurants and major grocery stores. It was felt that in addition to bringing these services to the neighborhood, these businesses would also be providing a source of employment for residents. One respondent was opposed to any type of business on the site. "Why not put people next to the Park (Candlestick State Park) where they can enjoy it ... not businesses." The other respondents would like a mix of housing and service-oriented businesses. One respondent mentioned that industry should be kept on Carroll Avenue, and another felt that office buildings or high-tech industry would not provide any jobs to the community.

Two respondents felt that in addition to the State Park, "healthy" recreation for the neighborhood children would be welcome, e.g., a roller skating rink. Video game arcades would not be welcomed.

Again, all respondents felt that no alternate uses would be appropriate for the site unless the access problems are solved. One respondent leads a group which is currently seeking to raise funds and support to halt the use of the Park for any event, including baseball and football, until existing problems are solved.

Other opinions expressed on alternate land uses included a concern that the site has geological problems which need to be considered given that a majority of the parking lot has been under water during recent rains.

A very strong opinion universally expressed was that whatever is decided ...to build a new stadium, upgrade Candlestick Park, or an alternate use of the Park site ..." there must be community input, ... The City should gather direct input from the grass-roots community ... the people who will be directly affected by any project".

SECONDARY DATA

In addition to elite interviews, we also analyzed secondary data such as the "1981 Report on Candlestick Park Access" prepared by the City of San Francisco; "The Future of Candlestick Park, March 1982", prepared by the San Francisco Giants, an August 1982 public opinion analysis by BBW Research for SPUR, correspondence to the Giants, press clippings and City files.

1981 Report on Candlestick Park Access

The "1981 Report on Candlestick Park Access" was instigated by protest from several Bayview-Hunter's Point community groups including the Ad Hoc Committee on Jamestown Avenue, the Bayview-Candlestick Park Citizens Action League and the parish members of St. Paul of the Shipwreck Church. Following are excerpts from petitions and letters to the City which prompted the study.

"The flow of traffic is such that.people coming to, and/or leaving from the church are unable to get in or out when there is traffic, and, are unable to park on Jamestown Avenue. It has been a very dangerous situation."

"The church and the people have suffered from the inconvenience of attending Saturday evening or Sunday morning services due to

the traffic situation. In the event of an emergency, it is impossible to come or go."

Petition, October 28, 1980
Parish of St. Paul of the
Shipwreck Church

"We, the undersigned residents of Jamestown Avenue, wish to make our voices heard in our collective desire to remove pre and post game traffic from our street. The noise, the pollution, and the inconvenience are major irritants to be sure. Our comings and goings as well as those of our families and friends are dictated by the scheduled sports season. On game days, resident parking is impossible as thousands of cars pass by our homes honking their horns, revving their engines, polluting our air, and throwing their debris into our yards. This we might learn to live with, but the threat to our safety is intolerable. We are heartsick and tired of picking up our dead animals off our street. We are alarmed at the disastrous outcome should a fire break out or a medical emergency occur on our street during this traffic, making prompt access impossible. We therefore demand an immediate review in pursuance of alternate access routes to Candlestick Park, routes that will not put the health, safety, and peace of mind of San Francisco neighborhood residents in jeopardy."

Petition, November 26, 1980
Ad Hoc Committee on Jamestown
Avenue

"It is commonly felt among the residents of the Bayview-Hunter's Point area that the voice of our community falls upon deaf ears at City Hall, that the voices of more economically viable interest always take precedence."

April 24, 1981 Letter to
Supervisors Quentin Kopp, Carol
Ruth Silver, Wendy Nelder from
the Ad Hoc Committee on
Jamestown Avenue

"BILL OF RIGHTS AS CITIZENS OF SAN FRANCISCO AND BAYVIEW/ CANDLESTICK

It is our right as residents to be able to drive in and out of our neighborhood at any time of the day and night without fighting traffic from Candlestick Park.

It is our right not to have emergency fire and police vehicles and ambulances blocked from our neighborhood by Candlestick Park traffic.

It is our right to be able to park in front of our homes at any time of the year without being ticketed or towed away.

It is our right to live in a neighborhood free of pollution, noise and litter caused by Candlestick Park traffic.

It is our right to streets which do not always need repairs because of all the traffic from Candlestick Park.

It is our right to live in a neighborhood without scheduling our work and lives around games at Candlestick Park."

Bay View/Candlestick Citizen's
Action League, July 9, 1981

Of the respondents interviewed in 1983, a near consensus of opinion is that conditions have not changed since the petitions were initiated. A review of files from the Board of Supervisors shows Resolution No. 318-82 was adopted establishing traffic regulations for pre and post game traffic at Candlestick Park for a trial period of four weeks commencing July 1, 1982.

San Francisco Giants

The March 1982 study, "The Future of Candlestick Park", prepared by the San Francisco Giants mentions several drawbacks to Candlestick Park which are not addressed by renovation of the facility.

"Access will remain a critical problem. A report prepared by the Department of Public Works at the request of the Board of Supervisors identifies several long-range solutions to the access problems at Candlestick Park and places a price tag on the solutions of $32,000,000.00."

"Parking will continue to be one of the biggest problems at Candlestick and the only solution appears to be the construction of multi-level parking garages. But these garages would not have daytime use because there is no demand for such use at Candlestick Park and would therefore not be cost efficient to build. Parking is a problem which is getting worse because of the loss of spaces due to the development of the State Park and it is a problem which must be addressed."

"Public Transit opportunities at Candlestick Park are severely limited by the fact that the stadium is not served by any form of fixed rail transit. This eliminates both BART and the Southern Pacific from serving the stadium, and a tremendous amount of Candlestick users are from areas served by those two carriers."

1982 SPUR Survey

A section of the September, 1982 survey by BBW Research for SPUR (San Francisco Planning and Urban Research) was devoted to questions about Candlestick Park. This was a telephone survey of 400 registered voters City-wide.

Following are tables for questions which relate to the quality of Candlestick Park as a facility, perceived problems with the facility, which of three stadium options the respondents preferred; 1) Improve Candlestick Park; Add Dome; 2) Sell Candlestick, Build New Stadium; 3) Leave Candlestick As Is, and demographics of the sample.

How would you Rate Candlestick Park as a sports facility?

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
Good	33 100% 8%	12 36% 9%	7 21% 6%	12 36% 16%
Fair	85 100% 21%	47 55% 34%	14 16% 12%	9 11% 12%
Poor	92 100% 23%	29 32% 21%	49 53% 42%	10 11% 14%
Not Asked	187 100% 47% *	48 26% 35%	47 25% 40%	42 22% 58%

o Those who give Candlestick a poor rating want to build a new staduim. Those who rate it fair would like to improve existing facilities. Those who rate it good would like to either improve Candlestick or leave things as they are.

* This question was only asked of those respondents who had attended events at Candlestick Park.

What problems do you think there are with the facilities at Candlestick Park?*

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
No Problems	23 100% $\boxed{6\%}$	3 13% 2%	1 4% 1%	10 43% 14%
Weather	229 100% $\boxed{57\%}$	91 40% 66%	86 38% 73%	30 13% 41%
Parking	68 100% $\boxed{17\%}$	29 43% 21%	21 31% 18%	15 22% 21%
Distance from City	58 100% $\boxed{15\%}$	14 24% 10%	28 48% 24%	9 16% 12%
Safety/ Security	49 100% $\boxed{12\%}$	16 33% 12%	19 39% 16%	8 16% 11%
Public Transportation Problems	38 100% $\boxed{10\%}$	14 37% 10%	16 42% 14%	4 11% 5%
Crowded Freeways/Roads	31 100% $\boxed{8\%}$	11 35% 8%	12 39% 10%	5 16% 7%

(Table continued on following page)

* Respondents could give more than one response.
All respondents were asked this question.

	What to do with Candlestick Park			
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Facilities	31	10	14	3
	100%	32%	45%	10%
	8%	7%	12%	4%
Other	35	10	13	10
	100%	29%	37%	29%
	9%	7%	11%	14%

- Voters who don't see any problems at Candlestick Park would like to see facilities left as they are. Those mentioning the weather problem are equally divided between building a new stadium and improving existing facilities. Voters with parking concerns approve of Candlestick improvements. Respondents mentioning other problems prefer the new stadium option.

Which Stadium Option Should The City Choose?

Demographics →

	Total	Political Ideology: Very/ Somewhat Liberal	Political Ideology: Moderate	Political Ideology: Very/ Somewhat Conser-vative	Sexual Preference: Straight	Sexual Preference: Gay/Bi-sexual	Labor Union Membership: Yes	Labor Union Membership: No	Length of Residency: Less Than 5 Years	Length of Residency: 5 To 15 Years	Length of Residency: More Than 15 Years
Total Sample	400 100% 100%	148 37% 100%	134 34% 100%	89 22% 100%	337 84% 100%	36 9% 100%	111 28% 100%	284 71% 100%	50 13% 100%	92 23% 100%	257 64% 100%
Improve Candlestick, Add Dome	137 100% 34%	57 42% 39%	49 36% 37%	23 17% 26%	119 87% 35%	12 9% 33%	41 30% 37%	95 69% 33%	23 17% 46%	30 22% 33%	84 61% 33%
Sell Candlestick, Build new Domed Stadium	118 100% 30%	42 36% 28%	37 31% 28%	27 23% 30%	100 85% 30%	9 8% 25%	37 31% 33%	78 66% 27%	14 12% 28%	26 22% 28%	78 66% 30%
Leave as is, no New Stadium	73 100% 18%	21 29% 14%	26 36% 19%	20 27% 22%	59 81% 18%	8 11% 22%	17 23% 15%	55 75% 19%	5 7% 10%	20 27% 22%	48 66% 19%
Other/Not Sure/Don't Know/Refused/NA	72 100% 18%	27 38% 18%	23 32% 17%	18 25% 20%	60 83% 18%	6 8% 17%	16 22% 14%	55 76% 19%	9 13% 18%	16 22% 17%	47 65% 18%

- When reading tables of crosstabulated data, the first number that appears is the number of respondents falling in the cell. The second number is the "row", or horizontal percentage for the cell. The third number is the "column", or vertical percentage. In this example, 42% of those favoring Candlestick improvements describe their views as very or somewhat liberal. Conversely, 39% of those with liberal political views favor improving Candlestick, rather than the other two options.

- Improving Candlestick is the preferred option across all of the categories in Table 1 except that conservatives would rather build a new stadium. New residents prefer improvements to a greater degree than the sample as a whole.

Which Stadium Option Should The City Choose?

Demographics ⟶

	Sex			Age				Occupation/Income						Race			
	Total	Male	Fe-Male	18-29	30-39	40-59	60 & Over	White Cllar /High Incme	White Cllar /Low Incme	Blue Cllar /High Incme	Blue Cllar /Low Incme	Outsd Labor Markt /High Incme	Outsd Labor Markt /Low Incme	Black	Asian	His-Panic	White
Total Sample	400 100% 100%	192 48% 100%	209 52% 100%	62 16% 100%	98 25% 100%	108 27% 100%	126 32% 100%	99 25% 100%	77 19% 100%	27 7% 100%	23 6% 100%	39 10% 100%	112 28% 100%	49 12% 100%	27 7% 100%	28 7% 100%	266 67% 100%
Improve Candle-stick, Add dome	137 100% 34%	61 45% 32%	76 55% 36%	30 22% 48%	38 28% 39%	30 22% 28%	37 27% 29%	40 29% 40%	30 22% 39%	10 7% 37%	7 5% 30%	7 5% 18%	34 25% 30%	24 18% 49%	12 9% 44%	8 6% 29%	89 65% 33%
Sell Candlestick, Build new domed stadium	118 100% 30%	73 62% 38%	45 38% 22%	15 13% 24%	18 15% 18%	42 36% 39%	40 34% 32%	33 28% 33%	20 17% 26%	11 9% 41%	6 5% 26%	12 10% 31%	29 25% 26%	11 9% 22%	8 7% 30%	8 7% 29%	78 66% 29%
Leave as is, no new stadium	73 100% 18%	31 42% 16%	42 58% 20%	7 10% 11%	22 30% 22%	17 23% 16%	26 36% 21%	13 18% 13%	12 16% 16%	5 7% 19%	8 11% 35%	10 14% 26%	22 30% 20%	3 4% 6%	3 4% 11%	4 5% 14%	55 5% 21%
Other/Not Sure/ Don't know/Refused/ NA	72 100% 18%	27 38% 14%	45 63% 22%	10 14% 16%	20 28% 20%	19 26% 18%	23 32% 18%	14 19% 14%	14 19% 18%	- - -	2 3% 9%	9 13% 23%	27 38% 24%	11 15% 22%	5 7% 19%	8 11% 29%	43 60% 16%

- Men prefer the new stadium option while women strongly support Candlestick improvements.
- Younger voters tend to strongly support improvements in Candlestick while older voters tend to support the new stadium option.
- Higher income blue collar voters (h=27) and higher income persons outside the labor market (n=39) prefer the new stadium option. Other status groupings prefer Candlestick improvements like the Sample as a whole.
- Support for Candlestick improvements is particularly strong among Black and Asian respondents. Hispanic voters are more evenly divided (n=27).

Which Stadium Option Should The City Choose?

Demographics →

	How Often Goes to Candlestick Park			Area					Party Registration			Own/Rent	
	Once a month or more	Less than once a month	Never	Park Mer/ Pacific Heights/ Nob Hill	China-town/ Rich-mond/ Sunset	Black	Mission/ Outer Mission	Castro	Demo-crat	Repub-lican	Indep-endent	Own	Rent
Total Sample	37 9% 100%	176 44% 100%	185 46% 100%	108 27% 100%	97 24% 100%	64 16% 100%	57 14% 100%	74 19% 100%	279 70% 100%	80 20% 100%	31 8% 100%	194 49% 100%	203 51% 100%
Improve Candle-stick, Add dome	17 12% 46%	72 53% 41%	47 34% 25%	32 23% 30%	30 22% 31%	29 21% 45%	24 18% 42%	23 17% 31%	104 76% 37%	20 15% 25%	11 8% 35%	62 45% 32%	74 54% 36%
Sell Candlestick, Build new domed stadium	11 9% 30%	60 51% 34%	47 40% 25%	40 34% 37%	29 25% 30%	14 12% 22%	15 13% 26%	21 18% 28%	81 69% 29%	27 23% 34%	7 6% 23%	62 53% 32%	55 47% 27%
Leave as is, no new stadium	6 8% 16%	25 34% 14%	42 58% 23%	18 25% 17%	20 27% 21%	8 11% 13%	8 11% 14%	19 26% 26%	45 62% 16%	19 26% 24%	6 8% 19%	38 52% 20%	35 48% 17%
Other/Not sure/ Don't know/Refused/ NA	3 4% 8%	19 26% 11%	50 69% 27%	18 25% 17%	18 25% 19%	13 18% 20%	10 14% 18%	12 17% 16%	49 68% 18%	15 21% 19%	7 10% 23%	31 43% 16%	40 56% 20%

oArea breakdowns:
1. Park Merced, Pacific Heights, Nob Hill, Golden Gateway
2. Chinatown, Richmond, Sunset, Telegraph Hill, North Beach
3. Black Areas: Western Addition, Bayview/Hunters Point, Ingleside, Visitacion Valley
4. Mission: Inner and Outer Mission
5. Castro: The Castro, Haight, Inner Sunset, Noe & Eureka Valleys, East of Twin Peaks

- Regardless of stadium usage, voters prefer the Candlestick improvements option. Non-users are equally divided between the three options.
- Park Merced area voters prefer a new stadium while voters in the Castro & Chinatown/Richmond/Sunset areas are evenly divided on what to do.
- Republicans prefer a new stadium , Democrats & Independents prefer Candlestick improvements.
- Homeowners are evenly divided between the new stadium & improvement options while renters favor improvements.

Print Media

In December of 1982, the San Francisco Chronicle ran a series of in-depth articles about Candlestick Park. The December 20, 1982 article by Glenn Dickey, "Why Candlestick Isn't Working - A Lesson in Obsolescence", outlined the major problems with the facility from the point of view of the teams and fans who use the facility:

- wind and cold
- parking
- access
- lack of public transportation
- location
- bad sight lines
- poorly maintained restrooms
- the Curse of Candlestick - "a guarantee that anything done subsequent to the original construction will be done wrong."

Subsequent articles dealt with the topics, "Should S,F. Scrap Candlestick?", "The Staggering Costs of a New S.F. Stadium", "Where to Build S.F. Stadium", "A Great Domed Stadium - How it Would Change S.F.", "How New Arena Would Affect Other Stadiums," and "An American Secular Religion: Big Time Sports." This series of articles elicited a variety of responses from the readers in the form of letters to the editor:

"Having done so little before for the helpless (old and poor) how can we talk seriously about $60 to $185 million for a domed stadium? We don't need one, Bob Lurie does."

"While Candlestick Park has many faults, it is an existing structure and it would be infinitely less costly to improve it than to start from scratch and build a new stadium,"

"I attend 20 to 25 games a year but have only made one Candlestick Park game in the last two years because of the double C - cold and crime."

"Over the past 6 years I have taken my family to Candlestick for about 70 games - all kinds: day games, night games, twi-night double headers.... The weather seldom made us uncomfortable and never miserable."

"I love the Giants ... but I haven't been to Candlestick since 1972. If I want to see them in person, I go to Dodger Stadium."

Giants' Fans

The Giants received 36 letters in 1982 relating to Candlestick Park or a proposed new facility in downtown San Francisco. Of

these letters, two were in support of improving Candlestick Park. Fifteen were supportive of a new downtown stadium and eight preferred a different location, such as the Peninsula, Seals Stadium, or Kezar. Five of the fans expressed dissatisfaction with a domed arena, preferring to see baseball in a traditional open air setting.

S.F. 49ers

The 49ers were contacted but had received no expressions of public opinion regarding conditions at Candlestick Park.

Residential Builders Association

On February 19, 1983 a meeting was called by David Miller, President of Rollamatic Roofs, Inc. and the Residential Builders Association Board of Directors (Omar Saleh, President; John Brennan; Art Occiopenti; John Raisford and David Miller) with representatives from the City Task Force, Bob Reeves; Stadium Study Project Coordinator, Don Crosby; Public Opinion Analysis, Judith Brown and representatives from Supervisors Nancy Walker and Louise Renne. The purpose of the meeting was to present a doming scheme designed by Mr. Miller, and for the Residential Builders Association to express a major concern they have toward any proposed stadium project. Mr. Omar Saleh was spokesman for the Association.

> "In the past, whenever San Francisco has had a multi-million dollar project, we have always had out of town developers come in here and do the work. It never fails. What happens is that we get residual money through employment but the bulk of the money leaves the City. It goes back to another state or another city where the developer is home based and this is where it gets spent. We, the Residential Builders Association, would like to make sure that this project stays in San Francisco, not only for the reason I just stated, but we have the expertise. There is no need to go out of the City or State to find someone to build that dome."

In a second interview with Mssr. Miller and Saleh, they reiterated their point that not only as regards a dome, but in every possible aspect of any new construction or renovation local businesses should be given priority for a contract whenever feasible.

Board of Supervisors

During the alternate site selection process the members of the Board were invited to attend a presentation of sites being considered and

asked for comment on proposed downtown sites as well as disposition of Candlestick Park. Board members who participated included Bill Maher, Doris Ward, Carol Ruth Silver, Harry Britt, Willie Kennedy and Nancy Walker. Members declining were Wendy Nelder, Louise Renne and Quentin Kopp. John Molinari and Richard Hongisto were unable to schedule time to participate.

Comments regarding Candlestick Park were:

- o Existing traffic problems must be solved
- o Suggestion to explore building a new stadium on Candlestick Park site
- o Preference for mixed income housing and blue collar industry on site if Candlestick is torn down.

Other Public Input

During the course of the study letters were collected which had been received by the Mayor, S.F. Planning Dept., the Giants, S.F. Supervisors and the study team, proposing a variety of ideas for stadium design, financing and site selection. The ideas included the following for Candlestick Park:

- o Building a commuter parking garage at the existing Candlestick Park site, which would alleviate game parking, and be used during the week by peninsula commuters and adding a public transit line from Candlestick to downtown.

- o The addition of service oriented business (auto repair, restaurants, medical and legal offices) to the existing Candlestick Park site.

- o The addition of luxury boxes at Candlestick Park on the upper levels.

- o The addition of a state-of-the-art scoreboard at Candlestick.

- o A public petition drive to show support for doming Candlestick Park.

- o A convertible dome on Candlestick Park.

C. ALTERNATIVES

This section is not applicable to Public Opinion Analysis.

D. ANALYSIS

EXISTING CONCERNS

Comparison of the varied types of data gathered show that there are shared perceptions regarding Candlestick Park. Two defined publics can be identified. One is those people who are evaluating and commenting on Candlestick Park as a facility (the teams, the press, the fans) and the other is those people who are evaluating the impact of the stadium on their neighborhoods (community groups and key leaders).

While their observations are from different perspectives, certain problems with the existing structure are shared.

Traffic:

Access to the stadium is a problem for the fans who spend time in traffic jams before and after events; a problem for the teams as traffic jams discourage attendance; and a major problem for the neighborhood residents who are held "hostage" in their houses by game traffic. Traffic is the #1 concern of the Bayview-Hunter's Point and Vistitacion Valley neighborhood leaders; mentioned as a "critical" problem by the Giants study; perceived as "inadequate" by the press and named as a problem by 8% of the SPUR survey respondents.

Transit:

Public transit is perceived as a problem by the users as there is no fixed rail transit directly to the Stadium. Fans from the Peninsula and North and East Bay are restricted to automobile transportation in order to attend games. The neighborhood residents are inconvenienced by the buses which crowd the streets during game-time causing noise and air pollution as well as contributing to the basic traffic problem.

Parking:

There is already limited parking at Candlestick Park which is a problem for the users. In the neighborhood, existing parking spaces are removed by increasing the number of traffic lanes used to access the stadium on some residential streets, and stadium users who choose or are forced to park in the streets adjacent to the stadium instead of the stadium parking lots.

Weather:

Weather conditions are mentioned as a problem only by the users of the stadium, the press and 57% of all the SPUR survey respondents. They are not mentioned as a problem by neighborhood community leaders.

Crime:

Crime is perceived as a problem by both users and neighborhood residents.

Facilities:

The condition of the facility at Candlestick Park is a major problem for the team. The press mentions poor seating arrangements and inadequately maintained restrooms. The neighborhood's major concern is the negative impact the deterioration of the facility has on surrounding land values and the quality of the neighborhood.

Littering/Destructiveness and Disrespect of Fans Toward Neighborhood Residents:

This problem is a concern of the neighborhood residents and not mentioned by the users. However, elimination of fan traffic from the residential neighborhoods would remove a large portion of this problem.

Negative Impact on Local Business:

Again this is perceived as a problem mostly by the affected neighborhoods. The Giants study mentioned that the Candlestick location has failed to generate any new business in the area. The residents are concerned that existing business patronage drops off on game days due to the severe traffic problem.

ALTERNATE USES

Upgrade Candlestick Park

A majority of the community leaders in the Bayview/Hunters Point and Visitacion Valley Neighborhoods feel that if the Traffic/Transit and Parking Problems are solved, the best use of the site would be upgrading the stadium facilities and the addition of a dome. There is a strong inclination for the community to perceive Candlestick Park, properly maintained, as

an asset to the community. The stadium is viewed as part of the area's identity.

In the 1982 SPUR survey, improving Candlestick Park was the preferred option of all demographic categories with the exception of conservative voters who would rather build a new stadium. The respondents in the SPUR survey were given three choices: Improve Candlestick, Add Dome; Sell Candlestick, Build a New Domed Stadium; Leave as is, no new Stadium; they were not asked to respond to alternate uses such as business or residential development.

The Giants study says "there is no question but that a renovation of Candlestick along with the construction of a dome would finally give the San Francisco Giants the opportunity to become a successful and stable baseball franchise." However, the study goes on to point out that the drawbacks not considered by renovation (Access, Parking and Public Transit) are critical problems and must be considered.

Non-Stadium Uses for the Candlestick Park Site

The only public group queried regarding non-stadium uses for the site were the community leaders of the Bayview/Hunters Point and Candlestick Park neighborhoods. Among this group, the strongest sentiment was toward "people-oriented use". The preferred option is a mixed-use development; a housing element of "affordable" housing adjacent to the State Park, and businesses such as shopping malls and restaurants which provide much needed services to the neighborhood and afford the best opportunity for employment of unskilled or semi-skilled workers and youth.

A major concern of the community leaders is that nothing should be done at the site until existing problems are alleviated, and that whatever decision is made regarding use of the site, it should include an element of community input from the "grass-roots" level.

Although none of the respondents specifically advocated an improved stadium with expanded mixed use development, all of them mentioned that the addition of new housing and service oriented businesses would be an asset to the community.

Whatever use decision is made, the City should be aware of the concern of the Residential Builders Association, that local designers, developers and businesses be used as much as possible in the construction of the project.

B. DOWNTOWN STADIUM

In studying the feasibility of introducing a new stadium into the downtown area of San Francisco, the task force and its study team were faced with the initial responsibility of searching for a proper site or sites. The data included in the Real Estate section of this division of the report is testimony to the extensive search that was conducted. It was concluded that selection of a specific site was impossible at this time. With the complexity of (unresolved) issues surrounding each site and the magnitude of planning for new projects in progress in the City, it was decided that selection of a logical "study area" was the best manner in which to proceed at this time.

A study area was selected south of Market at the northern end of China Basin. This strip of land between 2nd and 7th Streets, Townsend and the China Basin Chanel, appears to have the greatest potential for the siting of a new stadium.

In order to illustrate the visual impacts on China Basin as well as the south side of the downtown area, the team selected a "demonstration site" between 3rd and 4th and Townsend and the China Basin Building. It must be emphasized here that by this choice, a preference is <u>not</u> being stated nor a recommendation made. In order to show what a stadium will look like in the overall texture of the Downtown/Central Business District, a site had to be selected for this demonstration.

No attempt was made to depict the potential developments proposed for the areas included in and surrounding the stadium study area. These planned developments are in their early stages and too uncertain to include at this time.

Similarly, in order to develop costs and to show potential "appearances", a structural system and architectural scheme had to be selected. The tensegrity dome and circular plan were chosen because they work together to respond to site constraints, ease of convertibility from football to baseball, lightness of structure, appropriate architectural expression and ability to open the roof on sunny days.

There are two major conditions that form the foundation of the feasibility of a downtown stadium. All of the planning and projections that are the basis for this report are fixed on these conditions.

1. <u>Condition One</u>:

   <u>Shared Parking</u> - The parking that is being planned into adjacent developments would be shared by the patrons of the new stadium.

2. Condition Two is tied directly to condition one and requires that all major stadium events take place only on week nights and weekends. In this way, parking facilities can be used for commercial parking during week days and be shared nights and weekends. This condition will also ease and resolve the flow of traffic in and out of the downtown.

Finally, meetings have been conducted with officials from the Building and Fire Departments of the City of San Francisco to review the basic code requirements for a downtown stadium. The City does not currently have building and fire code regulations that specifically cover all aspects of the construction of a facility of this nature and magnitude. In addition, the City codes are in the process of revision at this tiem.

The code officials are satisfied that the issues related to proper life safety design can be resolved at the appropriate design development phase. They have stated that final code interpretation will most likely rest in the hands of the Board of Permit Appeals.

1. REAL ESTATE

A. SCOPE:

The Scope of services for this element of the study is summarized as follows:

(1) Explore all possible locations that can accommodate a stadium, particularly sites closer to downtown, and determine which are suitable for a stadium.

(2) Determine a preliminary appraisal of the property that would need to be acquired at alternative sites.

(3) Identify the relocation needs and estimate relocation costs that would result at alternative sites.

B. DATA:

The data that was used to research each of the above tasks is as follows:

(1) South-of-Market real estate comparables for transactions and listings since 1978 (Appendix A).

(2) Parcel-level data gathered by the San Francisco Department of Planning, CECAP Study (Appendix B).

(3) Stadium footprints provided by HNTB/CTMA/GEIGER BERGER (Appendix C).

(4) Geotechnical Site Evaluation reports provided by Harding Lawson Associates (Appendix D).

C. ALTERNATIVES:

The study team attempted to identify every conceivable site near downtown that can accommodate a stadium, including suggestions by the general public, organizations and elected representatives. A total of 18 sites were identified. Four of these sites were not evaluated in detail because they had obvious major problems. These sites are:

(1) 1st to 2nd Streets/Folsom to Harrison

The construction of a stadium at this location would create insurmountable costs as well as create visual problems.

(2) Central Block of YBC

The single block is not large enough to accommodate a stadium and because of the status of the YBC project, a stadium at this location would create seriously disruptive legal, political and social problems.

(3) <u>In the Bay</u>

A stadium in the Bay would be extremely expensive, would have access problems and is in violation of many regulations governing the use of the Bay.

(4) <u>Kezar Stadium</u>

Access problems would disrupt residential areas over a broad part of the City and modifications to the structure would be difficult and expensive.

Fourteen sites were evaluated in detail. These sites are illustrated on Map 1 on the following pages. Sites 1-10 were identified by the Stadium Task Force and evaluated in the "Stadium Feasibility Analysis - Work Program", October 1982. Site 11 was suggested by BART to explore the feasibility of a site near a BART station. Site 12 was suggested by Mario Ciampi to explore the feasibility of a closer relationship to Moscone Center. Site 13 was suggested by several persons as being the only site near downtown that could be assembled. Site 14 was suggested by the SPUR Stadium Committee.

The sites that were evaluated are listed as follows:

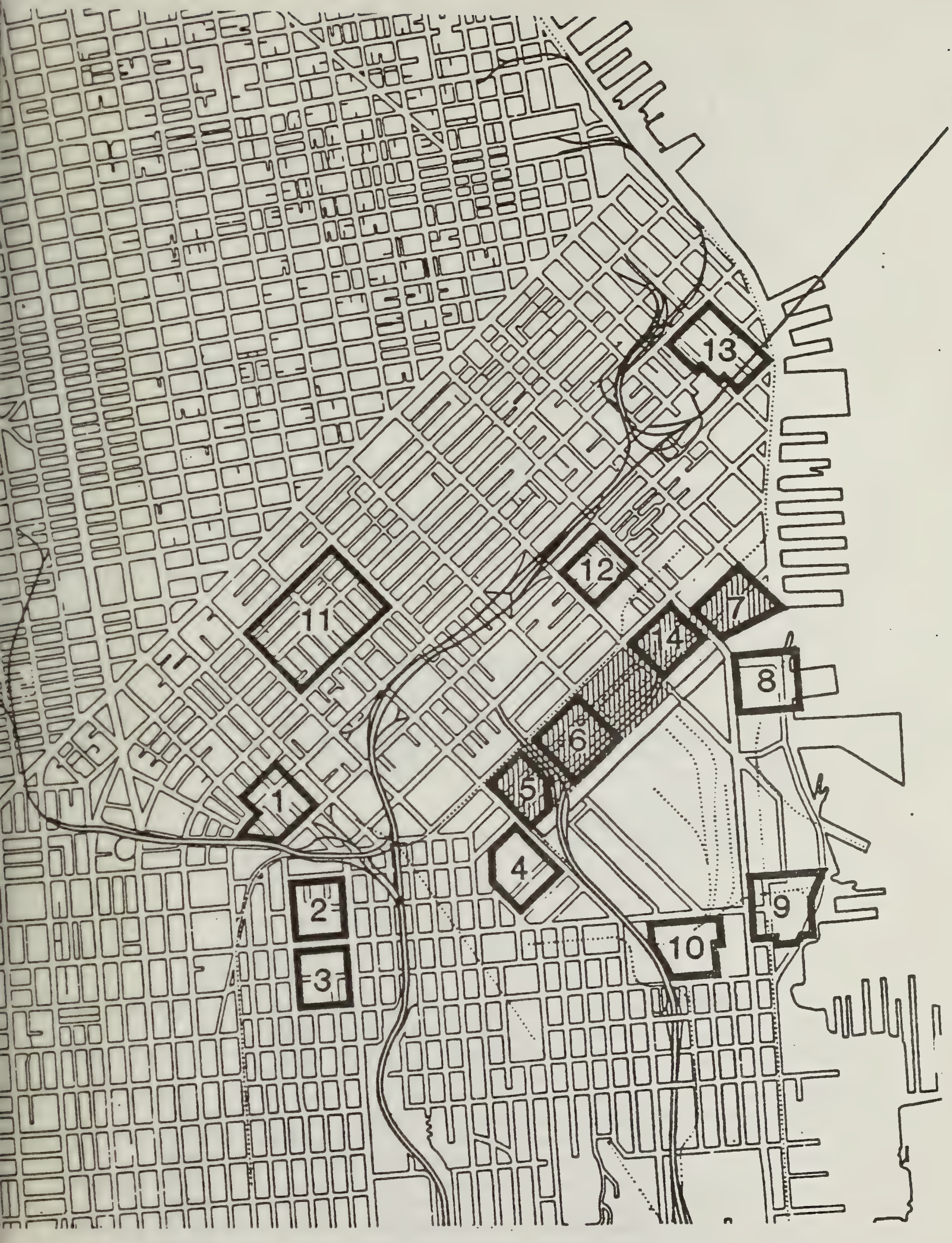
(1) Falstaff Brewery. (10th & Harrison).
(2) Seal's Stadium ((16th to Alameda/Potrero to Bryant).
(3) Franklin Square (16th to Mariposa/Potrero to Bryant).
(4) Showplace Square (7th to 8th/Berry to Irwin).
(5) Northwest Mission Bay (7th and Townsend).
(6) North Central Mission Bay (5th to 6th/Berry to Townsend).
(7) China Basin (2nd to 3rd/King to the Bay).
(8) Mission Rock (3rd to Pier 50/China Basin Channel to 800 feet).
(9) Southeast Mission Bay (16th and 3rd).
(10) Southwest Mission Bay (16th to Mariposa/I-280 to 3rd).
(11) South of Market (6th to 8th/Mission to Folsom).
(12) Moscone Center Area (3rd to 4th/Bryant to Brannan).
(13) Rincon Hill (Folsom to Bryant/Spear to Beale).
(14) Northeast Mission Bay (3rd to 4th/Townsend to Berry).

D. <u>ANALYSIS:</u>

<u>SITE EVALUATION CRITERIA</u>

The Study Team identified 7 factors which it felt were important determinants of site feasibility. These factors are:

(1) ACQUISITION COSTS
a. Availability
b. Land cost
c. Improvement cost
d. Relocation cost



ALTERNATIVE STADIUM SITES

(2) ACCESS (EXISTING AND POTENTIAL)
   a. Transit
   b. Pedestrian
   c. Vehicular
   d. Parking
   e. Impacts on neighborhood

(3) PUBLIC ACCEPTANCE
   a. Displacement
   b. Acceptability (Appropriateness)
   c. Urban Design (Compatibility)
   d. Trade-offs

(4) TECHNICAL CONSIDERATIONS
   a. Foundation Support
   b. Dewatering
   c. Shoring
   d. Excavatability

(5) SIZE AND FIT
   a. Adequacy for stadium footprint
   b. Impact of site constraints on stadium design
   c. Impact on stadium circulation

(6) ASSEMBLY TIME

(7) POLICY CONFLICT
   a. Impact on proposed development
   b. Relationship to existing land use controls

Each of the 14 sites was evaluated by assigning a score from 0(bad) to 5(good) for each of the 7 factors listed above. The criteria which was used to assign these scores is as follows:

(1) <u>ACQUISITION COSTS</u>
SCORE 0: Land cost exceeds stadium cost (over $100 million)
" " 1: Land cost is 90% to 100% stadium cost
" " 2: Land cost is 75% to 90% stadium cost
" " 3: Land cost is 50% to 75% stadium cost
" " 4: Land cost is 25% to 50% stadium cost
" " 5: Land cost is 10% to 25% stadium cost

(2) <u>ACCESS</u>
SCORE 0: No transit/inadequate auto access/no existing parking/poor pedestrian relationship/major impact
" 1: No transit/adequate auto access/no existing parking/poor pedestrian relationship/major impact
" 2: No transit/adequate auto access/no existing parking/poor pedestrian relationship/no significant impact
" 3: Good transit/adequate auto access/no existing parking/poor pedestrian relationship/no significant impact
" 4: Good transit/adequate auto access/existing parking/poor pedestrian relationship/no significant impact
" 5: Good transit/adequate auto access/existing parking/good pedestrian relationship/no significant impact

(3) PUBLIC ACCEPTANCE

SCORE 0: Severe dislocation/inappropriate to existing and proposed neighborhood environments
" 1: Severe dislocation/compatible with neighborhood
" 2: Moderate dislocation/compatible with neighborhood
" 3: Minimal dislocation/incompatible with neighborhood
" 4: Minimal dislocation/may be compatible with emerging neighborhood environment
" 5: No dislocation/appropriate to existing and proposed neighborhood environments

(4) TECHNICAL CONSIDERATIONS

SCORE 1: Bay mud present below field level requiring pile foundations and costly shoring system
" 2: Shallow Bay mud below field level requiring less costly pile foundations and shoring system
" 3: Bay mud not present at field level but thick above/shoring system would be required
" 4: Little or no Bay mud present/site favorable for foundations and shoring

(5) SIZE

SCORE 0: No structure type will fit
" 1: Site constraints will have a major impact on stadium design
" 2: No score
" 3: Site will accommodate all stadium types, but there will be a major impact on circulation
" 4: Site will accommodate all stadium types, and there will be a minimal impact on circulation
" 5: Site will accommodate stadium and circulation footprint for all stadium types

(6) ASSEMBLY TIME

SCORE 0: 5 or more years
" 1: 4 to 5 years
" 2: 3 to 4 years
" 3: 2 to 3 years
" 4: 1 to 2 years
" 5: 1 year or less

(7) POLICY CONFLICT

SCORE 0: Not compatible with any existing policy
" 1: Substantial conflict with most policy/limited compatibility
" 2: Major rethinking of most policy will be required
" 3: Major rethinking of some policy will be required, but compatible with most policy
" 4: Minor modifications to existing policy may be required
" 5: Does not require modification of any existing public policy

The 14 sites and 7 factors were arranged into a matrix for the purpose of evaluation. Scores assigned represent the cumulative opinion of the study team and others. Scores were tabulated, with no emphasis given on any of the factors, and the ranking of the best 5 sites is as follows. The matrix used is presented in Appendix E.

1) Site 14 .... Score 24.0
2) Site 6 .... Score 22.5
3) Site 8 .... Score 22.0
4) Site 7 & 13 .... Score 21.0
5) Site 2 .... Score 20.0

For the purpose of a sensitivity analysis, certain factors and groupings of factors were weighted by a factor of 2. Five such analyses were performed with the following weightings:

1) Cost
2) Cost and Time
3) Public
4) Public and Policy
5) Access

These 5 matrices are also presented in Appendix E. The conclusions reached by this analysis is as follows:

SITE 1 : This site is weakest in criteria of size and access. It is inconvenient to major public transit and is not in an area of significant parking resources. Several major streets would have to be closed to assemble enough property for a stadium site. Additionally, this site has poor soils and would require expensive foundations.

SITES 2/3: These sites are both adequate in size but are not well located for transit access. Further, they are in an area where the scale and nature of the stadium would be disruptive to the immediate area to the south. There is little parking resource, and the sites would probably have to be combined to make them work. These sites have fairly good soil conditions.

SITE 4 : This site, though adequate in size, would be most disruptive to the developing Showplace Square area. Two major private developments are planned for this site. Public transit access to this area is not very good. Soils in this area are adequate, although substantial shoring would be required.

SITE 5 : Site 5 is suitable in that it is not disruptive to existing or emerging areas, and is next to highway and parking resources. It is somewhat removed from major in town transit but can be accessed by Southern Pacific trains, an extension of the Embarcadero Light Rail Lines and could be served from Market Street via 6th and 7th Streets. Soils in this area are not very good with considerable amount of bay mud to be dealt with. There is also a major sewage pumping station and transport storage facility at the southern end of the site that would be disrupted.

SITE 6 : Site 6 is similar to Site 5, however, the soil condition is worse and the site is presently contemplated as part of the Mission Bay Plan. It is possible , however, that the Mission Bay Plan could be successfully altered to accommodate a stadium somewhere on its northern boundary along Townsend Street.

SITE 7 : This site is well located near the 3rd and 4th Street traffic loop and can be served by 2nd Street, Light Rail Lines on the Embarcadero, highway 280 extension or boulevard, and the Southern Pacific Rail Lines. The site has a potentially attractive water oriented relationship which could be developed with a public edge to the Bay. Its relation to Site 14, which is proposed for high intensity development could be a benefit if that site is also used as a major parking resource. Its weakness is its proximity to the South Beach development area and some conflict with the Port's development goals. Soils on this site are fairly decent with some shoring required but without need for a substantial piling system. The physical configuration of the site makes the accommodation of a stadium somewhat difficult.

SITE 8 : Site 8 is the lowest cost site. It is also sufficiently large to accommodate any stadium configuration desired, and it has a prominent location on the Bay edge. The problems with Site 8 are threefold. First, it is in conflict with Port planning. Second, it has substantial access problems. And third, the soils are extremely poor and would require the most costly foundation system.

SITE 9 : Site 9 is of good size and reasonably low cost, but its proximity to Potrero Hill would create some visual conflicts. Additionally, access is difficult, and there are substantial soils problems with this site.

SITE 10 : Site 10 is similar to Site 9 in all characteristics except it is somewhat more constricted in size and has a significantly better soils condition than Site 9.

SITE 11 : This site has the obvious appeal of being extremely close in and of having sufficient size to accommodate a stadium and ancillary needs. The site would have excellent transit access as well. The site has two overriding problems which preclude it from further consideration. The first of these is cost. Not only is the land cost high, but the relocation costs would be staggering. The question of "Urban Fit" is also significant. There would be major disruption to an established area and an unacceptable relationship of a stadium structure to the existing City fabric.

SITE 12 : This site is reasonably well located for access but severely limited in size and would not be viable without substantial alteration of the existing street patterns which are important thoroughfares. Land costs are moderately high, however, the soils condition on this site is reasonably good. The displacement and acquisition costs in this area, coupled with disruption for the urban fabric would be overwhelmingly negative.

SITE 13 : Site 13 is well located to downtown, close to the Trans Bay Terminal, BART, within walking distance from the central business district, close to the Embarcadero, and close to freeway on and off ramps. The site is of appropriate size and fits next to bridge and highway ramps which would help to mask its scale. Rincon Hill rises to the west above the site, so that the proposed residential plan for that hill, although impacted, could still be successful. Because of extensive State and Federal holdings of these properties, and because of a fairly high land and relocation cost this site is not appropriate for further study.

SITE 14 : This site is well located on the 3rd and 4th Street couple, relating to YBC (Moscone Center), Southern Pacific, the extension of the Embarcadero Line, and the terminus of highway 280. The site is presently contemplated for high density use in the Mission Bay Master Plan but could be suitable if a land swap with Site 7 was accomplished. This would surround the stadium with relatively high intensity development in the Mission Bay project which would be an appropriate scale relationship to the proposed stadium. It would also relieve the pressure of the adjacency of Site 7 to the South Beach project area. The soils on this site are reasonably good, and the site is of adequate size, so that a stadium could be constructed while still retaining the existing China Basin building.

With further input by the principal Stadium Task Force Group, a stadium site zone was established which encompasses sites 5, 6, 7, and 14. This zone is the target zone further studied by the Principal Consultants.

ESTIMATE OF ACQUISITION AND RELOCATION COSTS

A study of property values throughout the South-of-Market area was conducted for the purpose of establishing a basis for estimating the acquisition cost of each alternative site. This study utilized 72 recent real estate comparables (Appendix A) and conversations with real estate brokers and developers to arrive at a generalized estimate of land and improvement values.

Parcel level data, including lot area and gross building area, was aggregated for each alternative site. This data is presented in Appendix B. The following table summarizes the key findings of this aggregation:

SITE	AREA (Acres)	PUBLIC LAND (Acres)	PRIVATE LAND (Acres)	PARCELS	GROSS BUILDING AREA (S.F.)
1	14.60	4.63	9.97	49	575,000
2	15.17	1.13	14.04	20	1,010,000
3	15.11	11.44	3.67	13	264,000
4	17.92	4.86	13.06	8	249,000
5	14.44	4.18	10.26	4	5,000
6	17.19	2.89	14.30	3	130,000
7	13.78	13.78	-0-	0	460,000
8	14.51	14.51	-0-	0	150,000
9	21.52	9.76	11.76	7	107,000
10	17.77	.47	17.30	1	200,000
11	47.03	11.66	35.37	304	2,068,000
12	10.34	1.59	8.75	46	616,000
13	21.90	14.97	6.93	5	1,500,000
14	14.62	2.97	11.65	4	0

Parcel-level data identifying relocation issues was also summarized for each site. The following Table summarizes the key findings of this aggregation.

SITE	RESIDENTIAL UNITS	BUSINESSES
1	13	32
2	8	11
3	0	11
4	0	2
5	0	3
6	0	2
7	0	48
8	0	3
9	0	9
10	0	6
11	421	155
12	102	72
13	0	9
14	0	3

Preliminary appraisals to estimate the cost of acquisition and site clearance required for the construction of a new stadium were completed for all fourteen alternate sites in the South of Market area.

These estimates are based on exterior inspection of the properties, data from various City departments, public records and knowledge of property values and recent sales in each area.

Included in each site analysis is the estimated cost and time required to relocate present occupants of any improved properties.

The relocation cost estimates were made by the Central Relocation Services of the City and County of San Francisco.

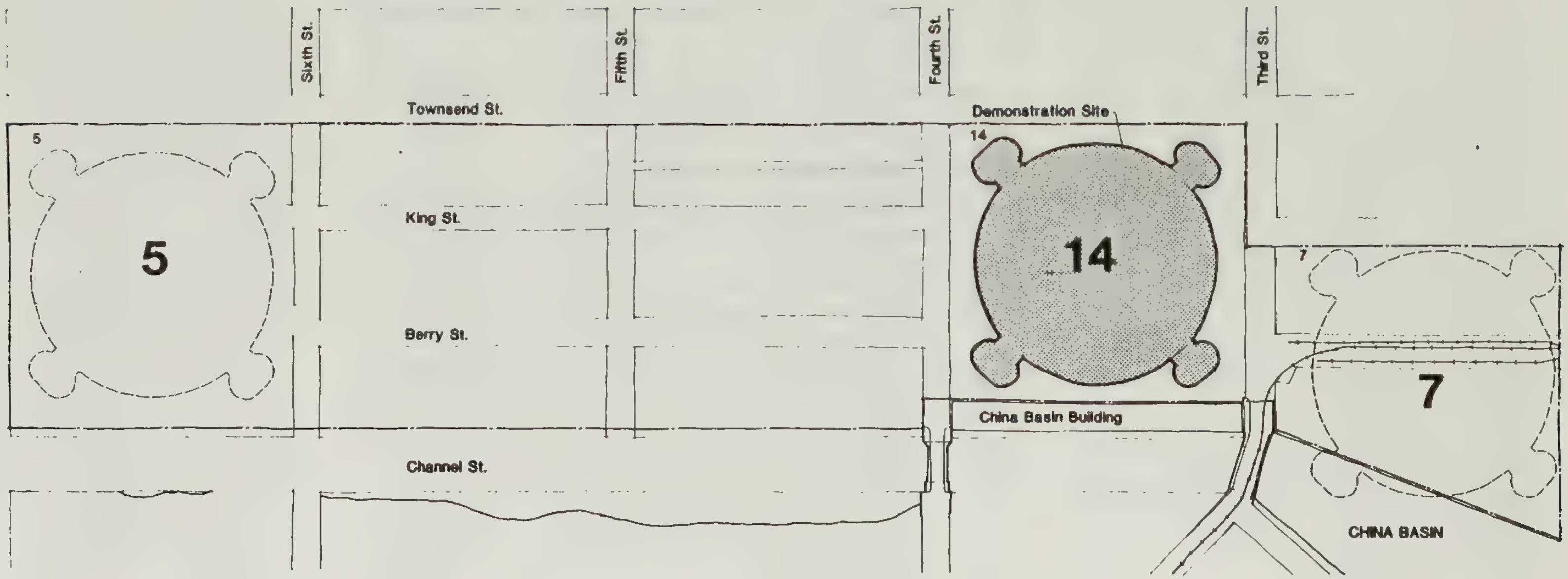
The total acquisition cost and time required to clear each site for construction purposes including relocation, demolition and other incidential costs are as follows:

SITE NO.	ESTIMATED COST OF ACQUISITION	TIME FACTOR
1	$ 23.7 million	2-1/2-3-1/2 years
2	31.7 "	2 -2-1/2 "
3	43.2 "	3 -3-1/2 "
4	27.5 "	2 -2-1/2 "
5	90.0 "	3 -4 "
6	33.0 "	2 -2-1/2 "
7	37.9 "	1-1/2-2-1/2 "
8	14.6 "	1 1-1/2 "
9	27.5 "	4 -5 "
10	19.3 "	2-1/2-3 "
11	200.0 "	4-1/2-5-1/2 "
12	37.4 "	3 -3-1/2 "
13	70.0 "	2-1/2-3 "
14	38.5 "	1 -1-1/2 "

STADIUM SITE ZONE

The stadium site zone selected for more detailed study contains 5 separate sites which could accommodate a stadium. Four of these 5 sites (numbers 5, 6, 7 and 14) were evaluated in the matrix. These sites are illustrated on the drawing on the following page.

In the matrix evaluation, site 14 scored the best in every evaluation, weighted or not. Site 6 scored second best on 3 of the 6 evaluations (and third best on the remaining 3). Site 7 was fourth best on 5 of the 6 evaluations. Site 5 scored among the five best sites on only 2 of the evaluations.



STUDY AREA — SITE PLAN

An important factor which contributes to the high scores for these sites is that few property owners would be involved and relocation would be minimal. In fact, property ownership for all 5 sites would involve only 5 owners -- the City of San Francisco, the Port, Caltrans, Southern Pacific and the China Basin Building. The distribution of property ownership for the 4 sites that were evaluated, expressed in acres, is as follows:

SITE	CITY R.O.W.	OTHER CITY	PORT	CALTRANS	SOUTHERN PACIFIC	CHINA BASIN	TOTAL
5	2.72	1.46	-0-	-0-	10.26	-0-	14.44
6	2.89	-0-	-0-	-0-	14.30	-0-	17.19
7	1.51	-0-	7.06	5.21	-0-	-0-	13.78
14	2.97	-0-	-0-	-0-	9.75	1.90	14.62

It should be noted that sites 6 and 14 have a portion of the total area encumbered by I-280 air-rights development.

Except for a portion of site 14, the entire focused study area is zoned M-2 and the maximum amount of gross building area allowed under present controls would be 5 times the lot area. The exception is a single block of site 14 which is zoned C-M where the maximum allowable building area would be 9 times the lot area. Under the existing planning code stadiums are a permitted use in a C-M, M-1, and M-2 zones (See 221.(i)).

Height limits vary substantially. Site 5 has a uniform height limit of 50 feet. Site 6 has a 50 foot limit on its northern half and a 40 foot limit on its southern side. Site 7 has a uniform height limit of 40 feet. The height limits on site 14 vary from 40 feet on its southern side to 105 feet on its northern half. However, it should be noted that the China Basin Building, located on the southern edge of site 14 (and within the 40 foot limit zone), is a 6-floor building which is 76 feet tall.

A portion of site 7, located within 100 feet of the edge of the Bay, is under Bay Conservation Development Commission control and will require their approval. The remaining sites are beyond the jurisdictional boundary of Bay Conservation Development Commission.

RELOCATION

Present uses on each of these sites which would need to be relocated or altered are as follows

SITE 5:

Southern Pacific rail yards (proposed for redevelopment).
Southern Pacific/Catrans commuter rail line.
North Shore Consolidation Pumping Plant and Outfall.

SITE 6:

Southern Pacific rail yards (proposed for redevelopment).
Southern Pacific/Caltrans commuter rail line.
I-280.

SITE 7:

35 miscellaneous tenants in leased spaces on Caltrans property (proposed for redevelopment).
12 miscellaneous tenants in leased spaces on Port property.
Port of San Francisco maintenance operation.

SITE 14:

Recreational Vehicle park (proposed for redevelopment).
Parking (proposed for redevelopment).
I-280.
Belt line connection.

ALTERNATIVE DEVELOPMENT

All of the potential stadium sites have alternative uses which have either been approved or are being formally considered by the Planning Department including projects by both the private and the public sectors. Sites 5, 6, and 14 are included as part of the proposed Mission Bay Project. Site 14 also includes an approved expansion of the China Basin Building. Site 7 will be partially affected by the resolution to the I-280 Transfer, otherwise, there is presently no alternative development proposed.

The private sector development program proposed for each site is as follows:

	SITE 5	SITE 6	SITE 7	SITE 14
MISSION BAY: (000gsf)				
Office Space	-0-	2,730	-0-	2,803
Parking (Spaces)	-0-	1,785	-0-	3,715
Parkland (acres)	14.44	-0-	-0-	-0-
CHINA BASIN BUILDING:				
Office Spaces(000gsf)	-0-	-0-	-0-	180
Parking (Spaces)	-0-	-0-	-0-	550

The land presently owned by Southern Pacific in sites 6 and 14 could yield a maximum gross building area of 3.1 million s.f. and 3.0 million s.f., respectively, if the present net land area was developed to the limit of existing controls. The proposed Mission Bay program for the land in site 6 is approximately 87.5% of the present limitation and site 14 is almost of 94% of the maximum possible. The approval process for the Mission Bay project is expected to take about 2 years (to August 1985) and this development program may be revised.

The portion of site 14 which is owned by the China Basin Building, as noted, has an approved development program for 180,000 additional gross square feet. This will increase the gross building area for the China Basin Building complex to about 675,000 square feet, a floor area to lot area ratio of about 3.0.

For purposes of this study, land cost estimates for those sites involving Southern Pacific's main railway tracks required to provide passenger train service in Sites 5 and 6 are based on the assumption that the tracks could be relocated in conjunction with the Mission Bay Development Plan. There could be a significant additional cost not included in the above estimates for these two sites if the tracks are required to be relocated underground or new track alignment requires the acquisition of other private property.

At Site No. 14, a major portion of the parking area adjoining the north side of the China Basin Building would be required for the Stadium. The loss of this parking to the adjoining owner has been taken into consideration in the estimated cost of acquisition.

APPENDIX A

South of Market Real Estate Comparables

OUTH-OF-MARKET REAL ESTATE COMPARABLES

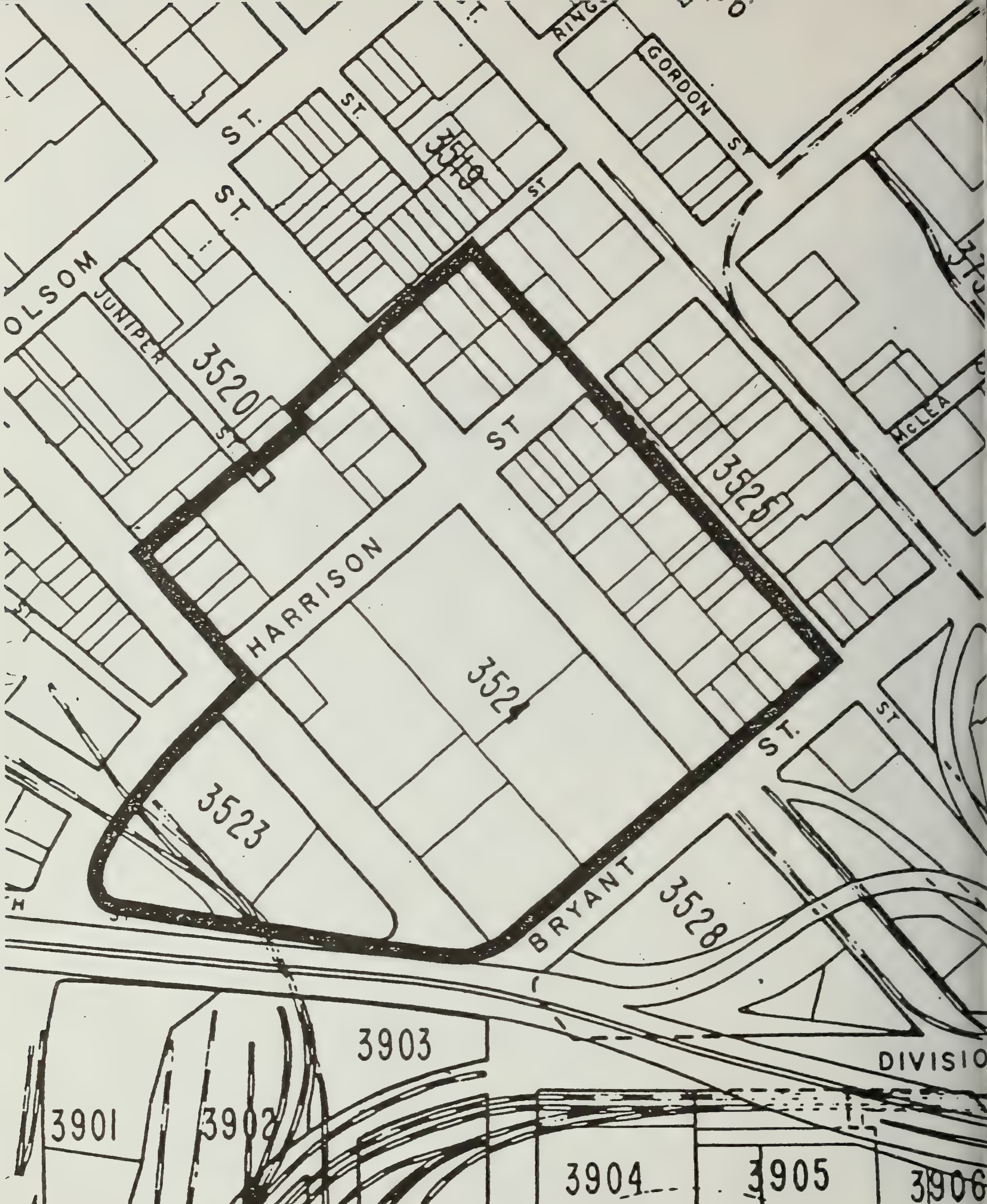
	CB #	SALE DATE	LIST DATE	PRICE	LOT AREA	BLDG AREA	FAR BUILT	LOT COST/SF	BLDG COST/SF
-3-O ZONE:									
1.	3715		EARLY 82	3750000	6201	12604	2.03	604.74	297.52
2.	3712	1978		10200000	18906	160600	8.49	539.51	63.51
3.	3708	UNKNOWN		9200000	11780	71000	6.03	780.98	129.58
4.	3707	ESCROW		8500000	12568	59000	4.69	676.32	144.07
-3-S ZONE:									
1.	3722	5/81		6746720	22640	0	.00	298.00	----
2.	3730	8/80		275000	2800	5600	2.00	98.21	49.11
3.	3733	4/81		850000	3825	7695	2.01	222.22	110.46
4.	3738	9/81		9000000	75625	125000	1.65	119.01	72.00
5.	3736	6/81		1400000	4887	26100	5.34	286.47	53.64
6.	3736	3/80		550000	7200	14000	1.94	76.39	39.29
7.	3722	7/80		7000000	19199	111421	5.80	364.60	62.82
8.	3725	4/80		2814000	10818	70000	6.47	260.12	40.20
9.	3721	ESCROW		2500000	9500	30000	3.16	263.16	83.33
-3-G ZONE:									
1.	3703	12/82		4500000	8250	53000	6.42	545.45	84.91
-3-R ZONE:									
1.	3706	1/83		11000000	12900	81036	6.28	852.71	135.74
2.	3706	10/80		13000000	17000	140000	8.24	764.71	92.86
3.	3705	9/80		4800000	12000	80000	6.67	400.00	60.00
-1 ZONE:									
1.	3525		EARLY 82	545000	7500	10000	1.33	72.67	54.50
2.	3751		EARLY 82	1500000	12000	13600	1.13	125.00	110.29
3.	3752	12/79		500000	16000	9600	.60	31.25	52.08
4.	3760	11/81		1200000	12732	12700	1.00	94.25	94.49
5.	3744		EARLY 82	40000000	151250	300000	1.98	264.46	133.33
6.	3750	8/80		1720000	43862	0	.00	39.21	----
7.	3763	5/81		3250000	37000	148000	4.00	87.84	21.96
8.	3755	5/81		740000	3250	9750	3.00	227.69	75.90
9.	3776	10/80		510000	8544	0	.00	59.69	----
10.	3529		EARLY 82	2400000	60000	0	.00	40.00	----
11.	3549+		EARLY 82	6500000	163000	100000	.61	39.88	65.00
12.	3775	1/81		1750000	8595	34000	3.96	203.61	51.47
13.	3776		EARLY 82	825000	5320	12040	2.26	155.08	68.52
14.	3776	11/80		650000	5880	17000	2.89	110.54	38.24
15.	3764+	11/80		10000000	92375	462000	5.00	108.25	21.65
16.	3755	6/81		1200000	6000	23000	3.83	200.00	52.17
17.	3759		EARLY 82	225000	6750	0	.00	33.33	----
18.	3789	11/81		3800000	17531	108000	6.16	216.76	35.19
19.	3789	EARLY 82		6100000	35086	185000	5.27	173.86	32.97
20.	3747	6/81		11500000	75625	150000	1.98	152.07	76.67
21.	3752	11/81		2500000	22688	45300	2.00	110.19	55.19
22.	3732	7/80		2000000	48000	0	.00	41.67	----
23.	3519		LATE 81	450000	4942	10342	2.09	91.06	43.51
24.	3774		EARLY 82	1500000	4428	13000	2.94	338.75	115.38
25.	3918	11/81		2500000	62800	120000	1.91	39.81	20.83

M-2 ZONE:

1.	3779	12/80		384000	12000	8000	.67	32.00	48.00
2.	3794	7/81		900000	13750	1500	.11	65.45	----
3.	3777	EARLY 82		425000	12000	5000	.42	35.42	85.00
4.	3778	EARLY 82		370000	4110	7350	1.79	90.02	50.34
5.	3778		EARLY 82	451000	10987	0	.00	41.05	----
6.	3773		EARLY 82	28800000	348480	0	.00	82.64	----
7.	3789		EARLY 82	2425000	30600	25000	.82	79.25	97.00
8.	3787	1/82		9200000	110000	210000	1.91	83.64	43.81
9.	3777		EARLY 82	2000000	36000	24000	.67	55.56	83.33
10.	3777	10/81		820000	20300	20300	1.00	40.39	40.39
11.	3787	EARLY 82		990000	30000	0	.00	33.00	----
12.	3794	5/81		3850000	12645	44000	3.48	304.47	87.50
13.	3788	11/81		1250000	22000	9600	.44	56.82	----
14.	3788	EARLY 82		3900000	22000	61800	2.81	177.27	63.11
15.	3788	EARLY 82		1200000	8800	24000	2.73	136.36	50.00
16.	3781	EARLY 82		3932500	151200	0	.00	26.01	----
17.	3774	EARLY 82		4250000	25600	117000	4.57	166.02	36.32
18.	3776	1/81		725000	10312	7500	.73	70.31	96.67
19.	3773		EARLY 82	17500000	345025	250000	.72	50.72	70.00
20.	3789+		EARLY 82	16000000	249598	150000	.60	64.10	106.67
21.	3785		LATE 81	4900000	22000	100000	4.55	222.73	49.00
22.	3786		LATE 81	3150000	16620	50000	3.01	189.53	63.00
23.	3794	3/82		3050000	18830	101685	5.40	161.98	29.99
24.	3784	7/82		425000	6000	6500	1.08	70.83	65.38
25.	3785	3/81		1500000	30938	123750	4.00	48.48	12.12
26.	3786	7/81		2500000	16760	70000	4.18	149.16	35.71
27.	3788	8/81		2100000	37813	58000	1.53	55.54	36.21
28.	3987	12/81		1100000	9443	27000	2.86	116.49	40.74
29.	3803	12/82		48000000	226708	456000	2.01	211.73	105.26
30.	3782	12/82		1250000	42000	1000	.02	29.76	----

APPENDIX B

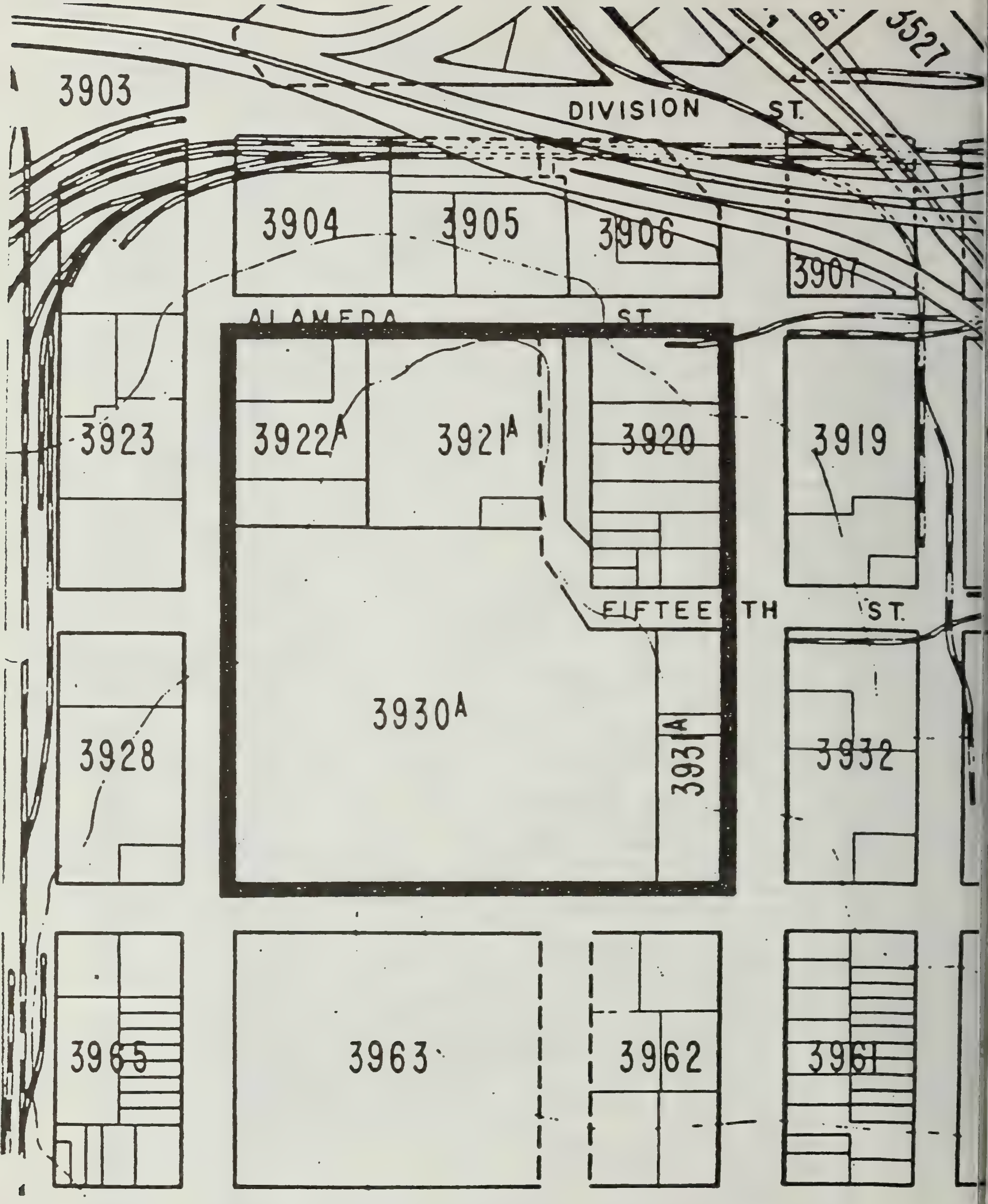
Alternative Site Maps and Parcel-Level Data


FOLSOM
JUNIPER
ST.
ST
3519
GORDON ST
3520
3525
McLEA
HARRISON
ST
3524
3523
BRYANT
3528
3903
3901
3902
3904
3905
3906
DIVISIO

SITE 1

3. LAND VALUE STUDY
SITE 1 (FALSTAFF BREWERY)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	HARRISON ST R.O.W.	52180	0
----	----	10TH ST R.O.W.	61460	0
----	----	11TH ST R.O.W.	41200	0
3519	14	SANKYO COMPANY	2375	3000
	15	P & S AUTO PARTS	4750	4750
	16	VACANT	2375	500
	17	CARWASH	7600	1250
	19	PARKING LOT FOR PARCEL 20	3200	0
	20	PLUMBING SUPPLY SALES	4800	5500
	21	PARKING LOT FOR PARCEL 20	5000	0
	23	RESIDENTIAL - 2 UNITS	2500	3000
	24	RESIDENTIAL - 2 UNITS	2500	3000
3520	10	QUALITY PRINTING	2700	3500
	11/12	STUBER TRUCK PARTS	9396	9400
	13	TEXACO SERVICE STATION	6300	1200
	15	CHROME PLATING COMPANY	1875	2500
	16	VACANT HARRISON SCHOOL	33050	60000
	19	UNPAVED PARKING LOT	5000	0
	20	YOUNG ELECTRIC COMPANY	2500	3200
	21	GENE'S AUTO UPHOLSTRY	5000	10000
	23	B & F MUSIC COMPANY	2500	3500
	24	MACHINE SHOP	2500	2500
3523	1	VETERANS CAB MAINTAINENCE	34000	25000
	8	PELLEGRINI REFRIGERATION	6000	6000
	12	VETERANS CAB LOT	15000	0
	?	CITY R.O.W.	14000	0
3524	ALL	VACANT FALSTAFF BREWERY	203500	300000
3525	39	RESIDENTIAL - 2 UNITS	2125	3500
	43	VACANT LOT	1955	0
	46	INDUSTRIAL STORAGE	1998	900
	47	TYPEWORLD TYPESETTERS	6120	6120
	50	VACANT LOT	2040	0
	51	HANEY'S OFFICE FURNITURE	6800	6800
	54	SEAGULL PRINTING	2125	2125
	55	SERV-ALL CLEANERS	4250	4250
	56	CONSTRUCTION COMPANY	2550	3200
	57	VACANT LOT	4800	0
	59	SPIRAL BINDING COMPANY	9600	25000
	60	ABA	2400	4800
	63	BRENNER BRUSH COMPANY	7500	7500
	65	BOSSMEYER IMPORTERS	5000	6500
	67	SMITH CONSTRUCTION COMPANY	2500	5000
	68	VACANT LOT	3000	0
	69	P & S SALES	2500	2500
	70	P & S SALES/RESIDENTIAL ABOVE	2500	3500
	71	D & L CARBUREATORS	2500	1800
	72	DON'S VAN & STORAGE	5000	10000
	74	AMBUSH BAR	1230	2460
	74A	RESIDENTIAL - 6 UNITS	1770	5310
	78	MCDONALD ELEVATOR	4038	3500
	83	UNKNOWN INDUSTRIAL USE	6375	12750
	84	VACANT LOT	7140	0
	85	BARNES CONSTRUCTION COMPANY	4700	9400
TOTAL			635777	574715



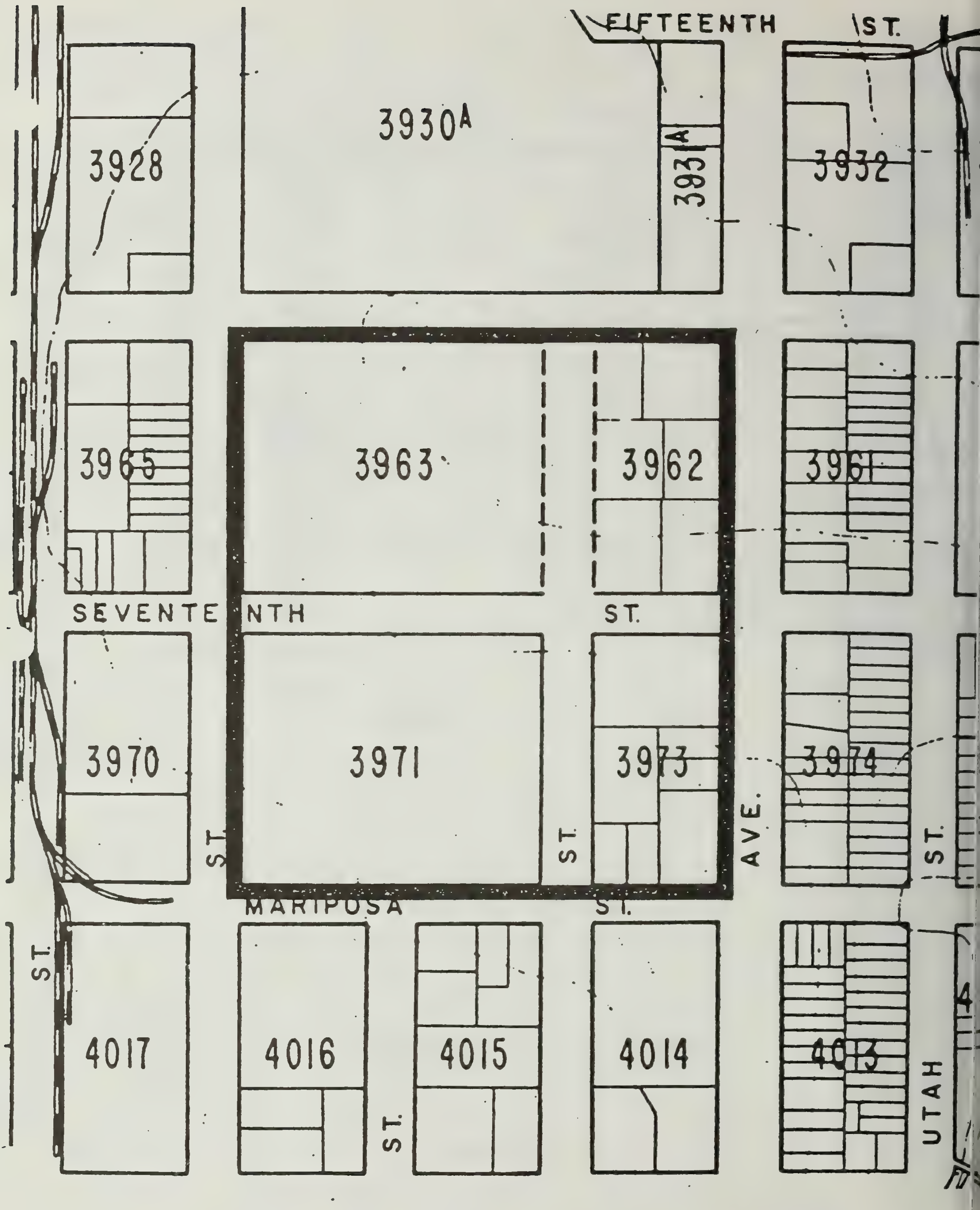
3903
DIVISION ST.
3527
3904
3905
3906
3907
ALAMEDA ST.
3923
3922A
3921A
3920
3919
FIFTEENTH ST.
3928
3930A
3931A
3932
3965
3963
3962
3961

SITE 2

SITE02-1

'.AND VALUE STUDY
;ITE 2 (SEAL'S STADIUM)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	15TH ST R.O.W.	16000	0
----	----	HAMPSHIRE ST R.O.W.	33200	0
3920	1	RENOVATED WAREHOUSE	20000	68000
	3	ANTIQUES/IMPORT DEALER	13800	13000
	4	UNKNOWN BUSINESS USE	11200	22000
	5	WHOLESALE FOOD COMPANY	10000	10000
	6	COSTUME RENTALS	5700	6000
	7	COMMERCIAL/RESIDENTIAL ABOVE	5800	8000
	7A	UNKNOWN USE	2001	2000
	7B	RESIDENTIAL - 2 UNITS	1819	1000
	7C	RESIDENTIAL - 4 UNITS	1922	2000
	8	RESIDENTIAL - 1 UNIT	2850	1000
	9	RESIDENTIAL - 1 UNIT	2850	2000
3921A	4	VACANT LOT & BLDG.	79000	2000
	3	VACANT LOT	5000	0
3922A	1	HOSTESS COMPANY	15000	75000
	1A	HOSTESS COMPANY	29000	145000
	2	HOSTESS COMPANY	16000	80000
3930A	1	LARGELY VACANT COMMERCIAL + PARKING	347760	540000
3931A	1	COMMERCIAL	13950	25000
	2	ABC TOWING	3050	0
	3	ABC TOWING	23000	8000
TOTAL			660902	1010000
		ACRES	15.17	

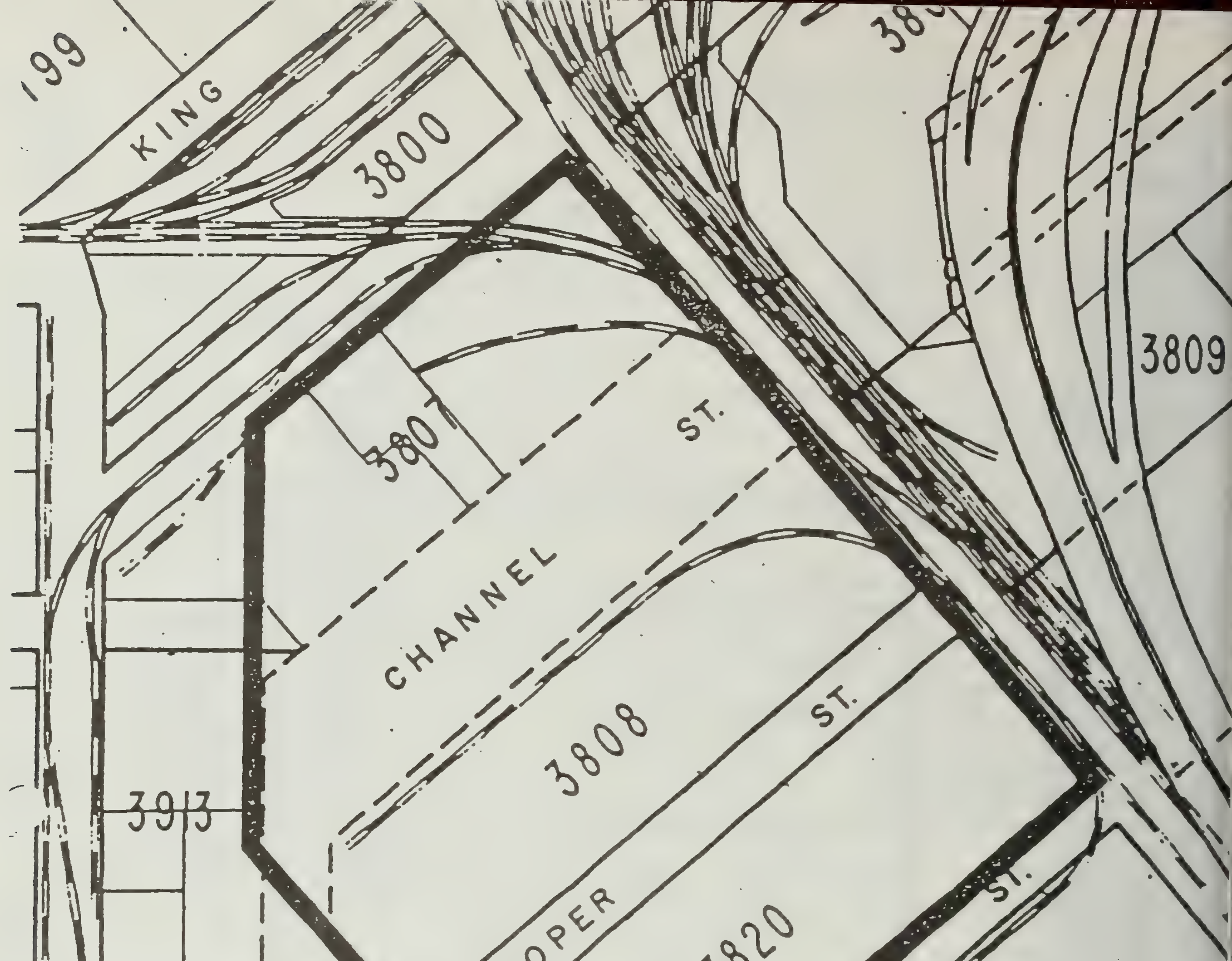

FIFTEENTH ST.
3930A
3928
3931A
3932
3965
3963
3962
3961
SEVENTEENTH ST.
3970
3971
3973
3974
ST.
ST.
AVE.
ST.
MARIPOSA ST.
ST.
4017
4016
4015
4014
4013
ST.
UTAH

SITE 3

SITE03-1

LAND VALUE STUDY
SITE 3 (FRANKLIN SQUARE)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	17TH ST R.O.W.	50160	0
----	----	HAMPSHIRE ST R.O.W.	64000	0
3962	7	CHEVRON STATION	15625	2000
	8	CAR WASH	11250	1000
	11	SHELL STATION	14100	2000
	10	MEDICAL OFFICES	15900	49000
	12	PARKING LOT	13750	0
	13	VACANT LOT	9375	0
3963	1	FRANKLIN SQUARE	192000	0
3971	1	MUNI STORAGE & REPAIR FACILITY	192000	88000
3973	1	SIGN COMPANY	30000	58000
	2	UNKNOWN COMMERCIAL USE	5000	5000
	2A	WAREHOUSE	5000	5000
	2C	PRODUCTION COMPANY	15000	30000
	2B	COMMERCIAL	5000	5000
	2E	COMMERCIAL	5000	4000
	2D	COMMERCIAL	15000	15000
TOTAL			658160	264000
		ACRES	15.11	

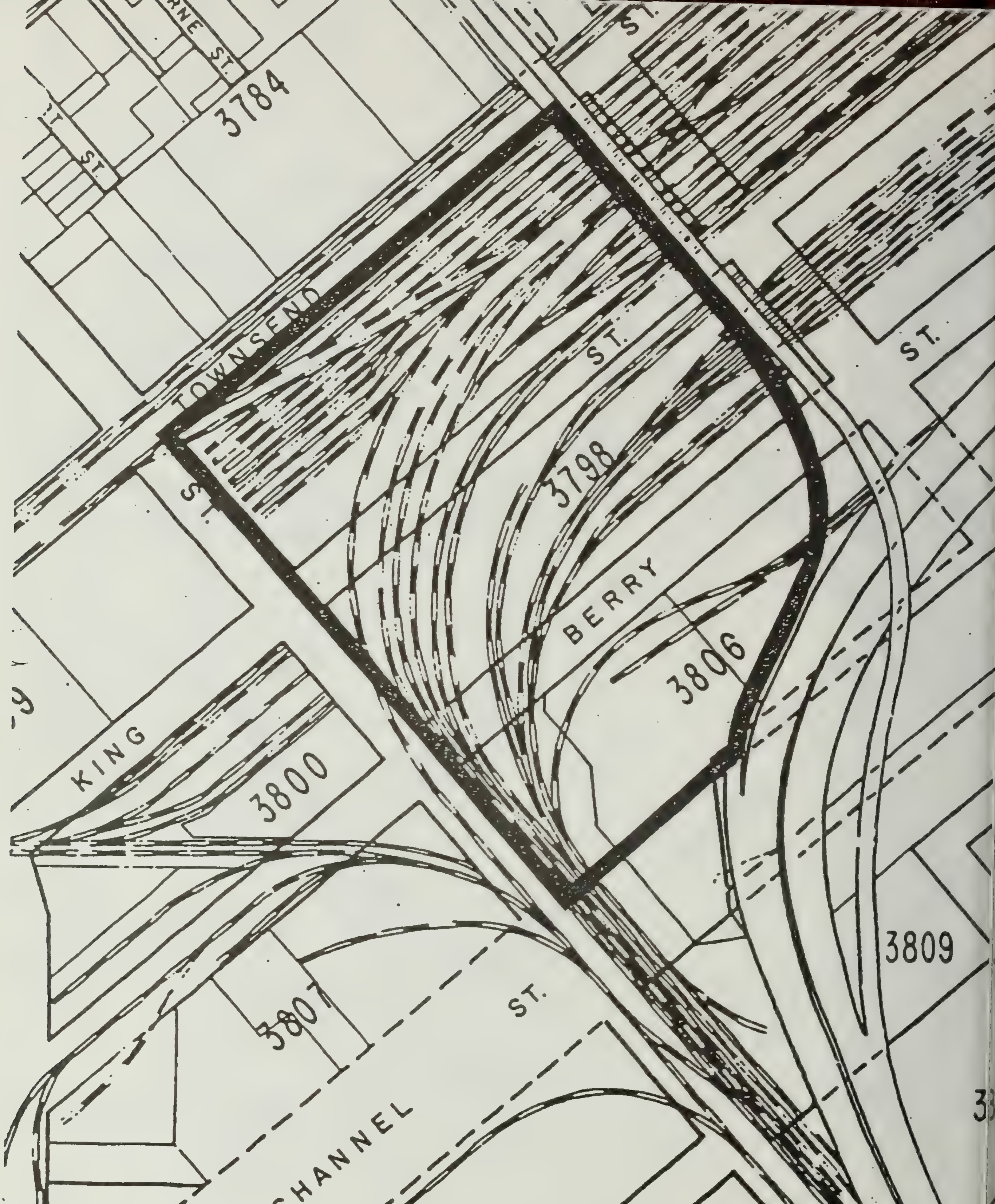

KING
3800
3807
CHANNEL
ST.
3808
3809
3913
HOOPER
ST.
3820
EIGHTH
IRWIN
ST.
3821
HUBBELL
ST.
3938
ST.
3939
ST.
ST.
ST.

SITE 4

SITE04-1

LAND VALUE STUDY
SITE 4 (SHOWPLACE SQUARE)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	CHANNEL ST R.O.W.	153800	0
----	----	HOOPER ST. R.O.W.	57750	0
3807	1	GOLDEN GATE SALVAGE	72000	20000
	2	GOLDEN GATE SALVAGE	20023	9000
	4	GOLDEN GATE SALVAGE	44375	20000
	8	GOLDEN GATE SALVAGE	25660	9000
	11	GOLDEN GATE SALVAGE	14600	0
3808	1	GREYHOUND MAINTENENCE	194112	31000
	2	GREYHOUND MAINTENANCE	375	0
3820	1	GREYHOUND MAINTENANCE	198000	160000
TOTAL			780695	249000
		ACRES	17.92	

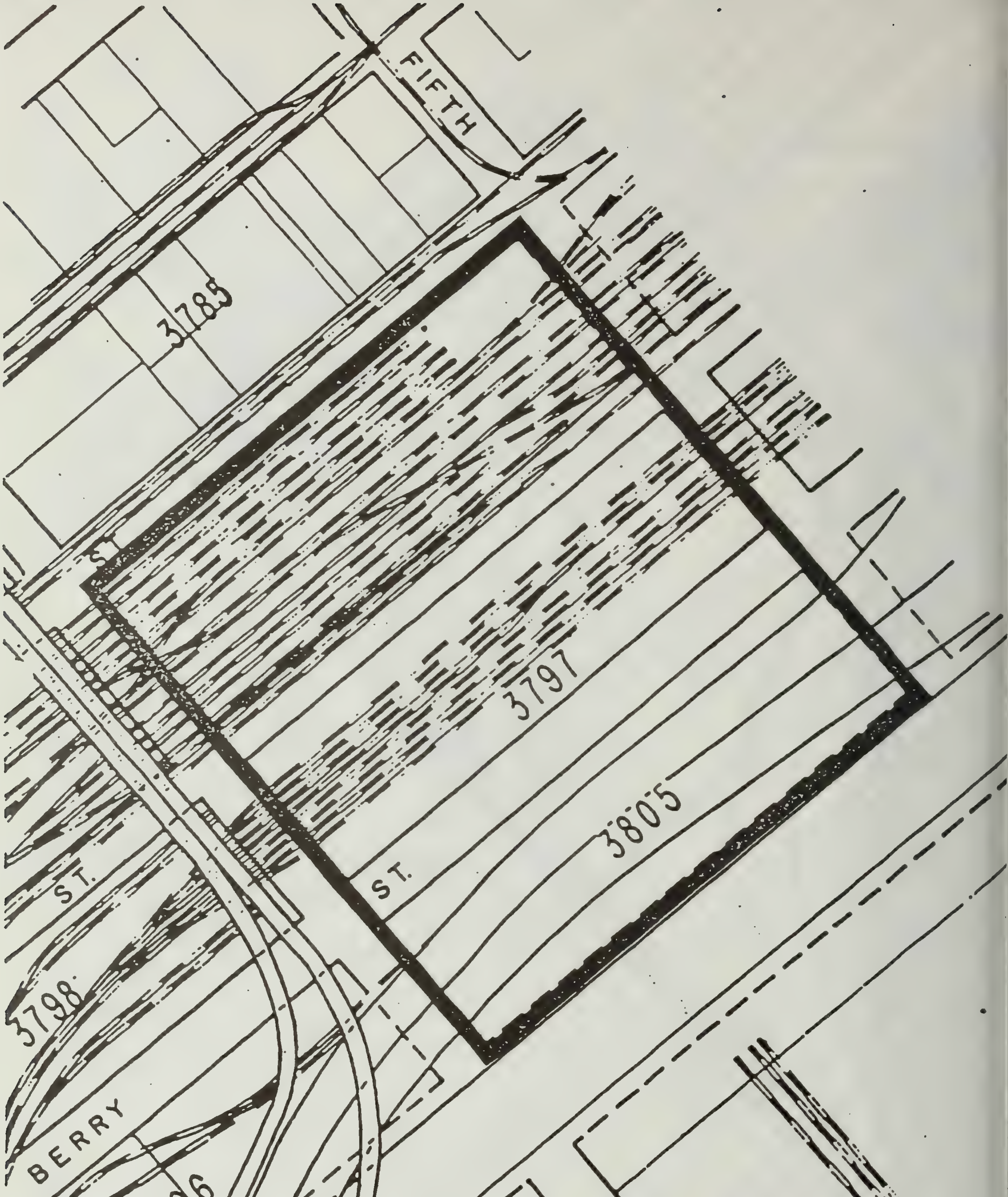

3784
TOWNSEND
ST.
ST.
3798
BERRY
3806
KING
3800
3807
ST.
CHANNEL
3809
ST.
ST.

SITE 5

ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 5 (MISSION BAY)

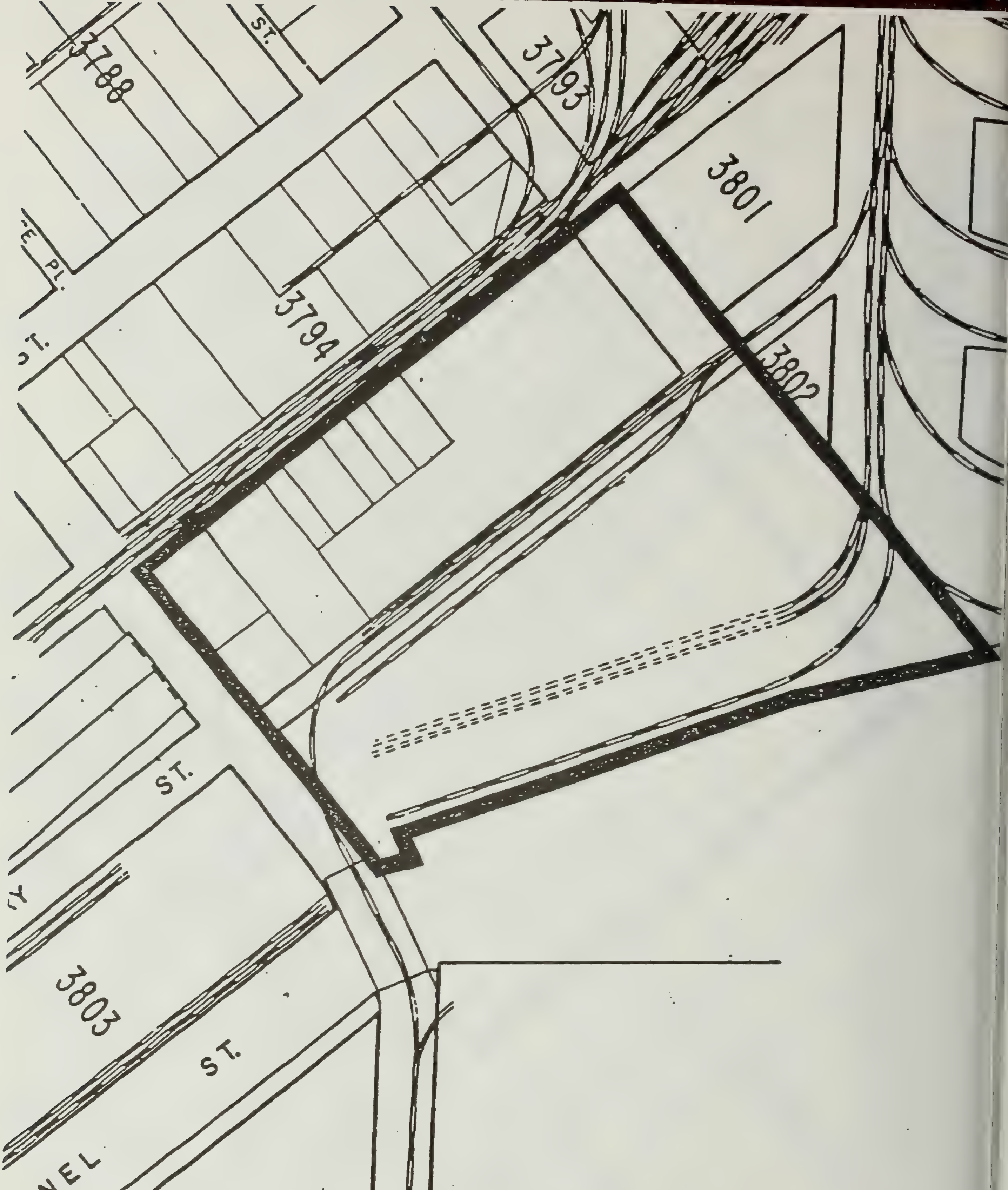
C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	KING ST R.O.W.	54250	0
----	----	BERRY ST R.O.W.	63938	0
3798	1	SP ENGINE YARD	213125	0
"	2	SP ENGINE YARD	186000	0
3806	6	CROSSTOWN SEWER OUTLET	63600	5000
	7	SP YARD	20000	0
	8	SP MAIN RAIL LINES	28000	0
TOTAL			628913	5000
		ACRES	14.44	



SITE 6

3. LAND VALUE STUDY
SITE 6 (MISSION BAY)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	KING ST R.O.W.	57750	0
----	----	BERRY ST R.O.W.	68063	0
3797	1	SP TERMINAL YARD	226875	0
"	2	SP FREIGHT HANDLING TERMINAL	198000	90000
3805	1	I-280 AIR RIGHTS R.O.W./SP YARD	198000	40000
OTAL			748688	130000
		ACRES	17.19	

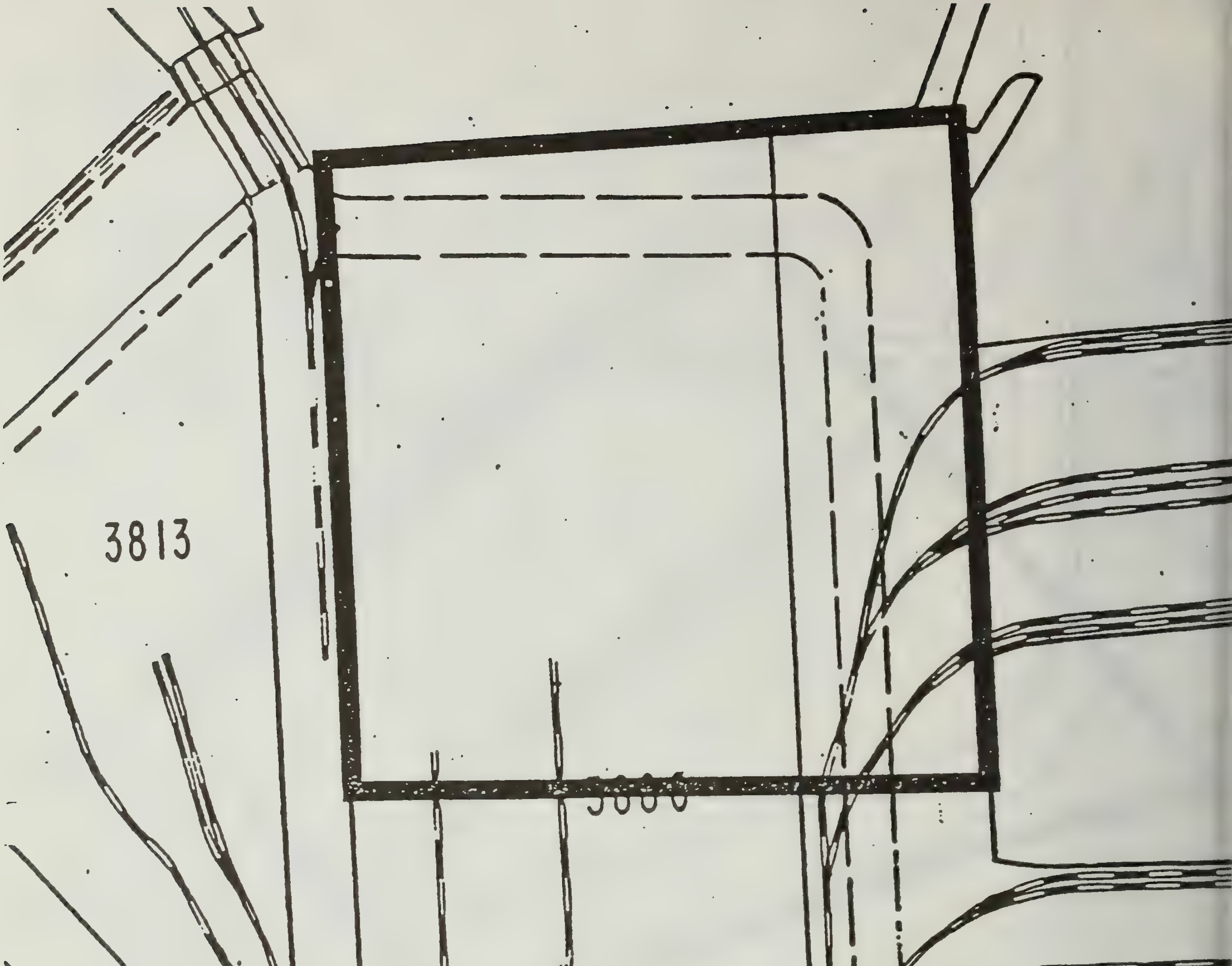


SITE 7

SITE07-1

LAND VALUE STUDY
SITE 7 (CHINA BASIN)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	BERRY ST. R.O.W.	43106	0
----	----	2ND ST. R.O.W.	22688	0
3794	1	CALTRANS R.O.W./LEASED SPACE	226875	200000
OL 336	2	PORT MAINTENANCE/LEASED SPACE	307518	260000
TOTAL			600187	460000
		ACRES	13.78	

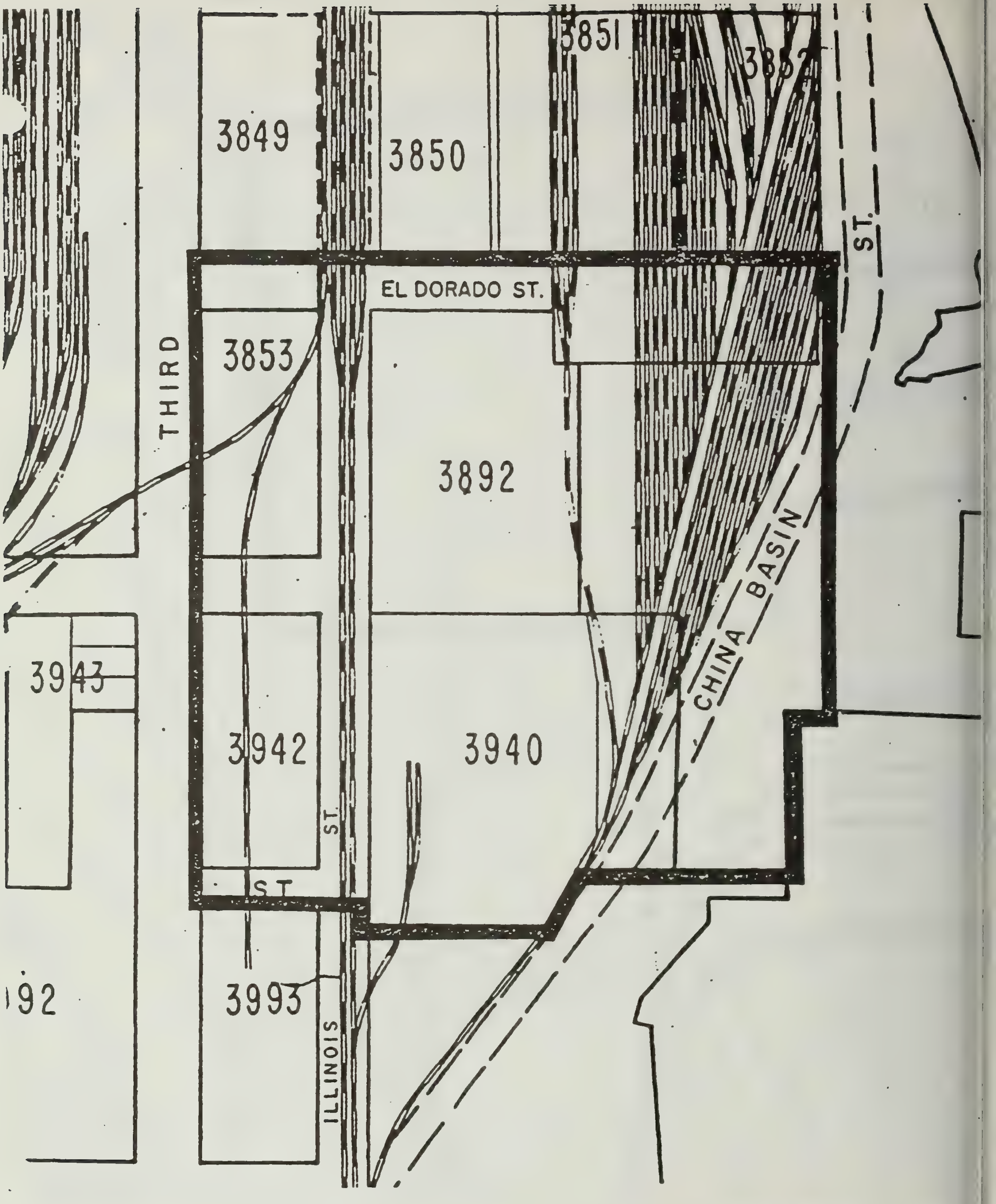


SITE 8

SITE08-1

LAND VALUE STUDY
SITE 8 (MISSION ROCK)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
3880	1	PORT PROPERTY	440000	100000
----	----	PORT PROPERTY	192000	50000
TOTAL			632000	150000
	ACRES		14.51	



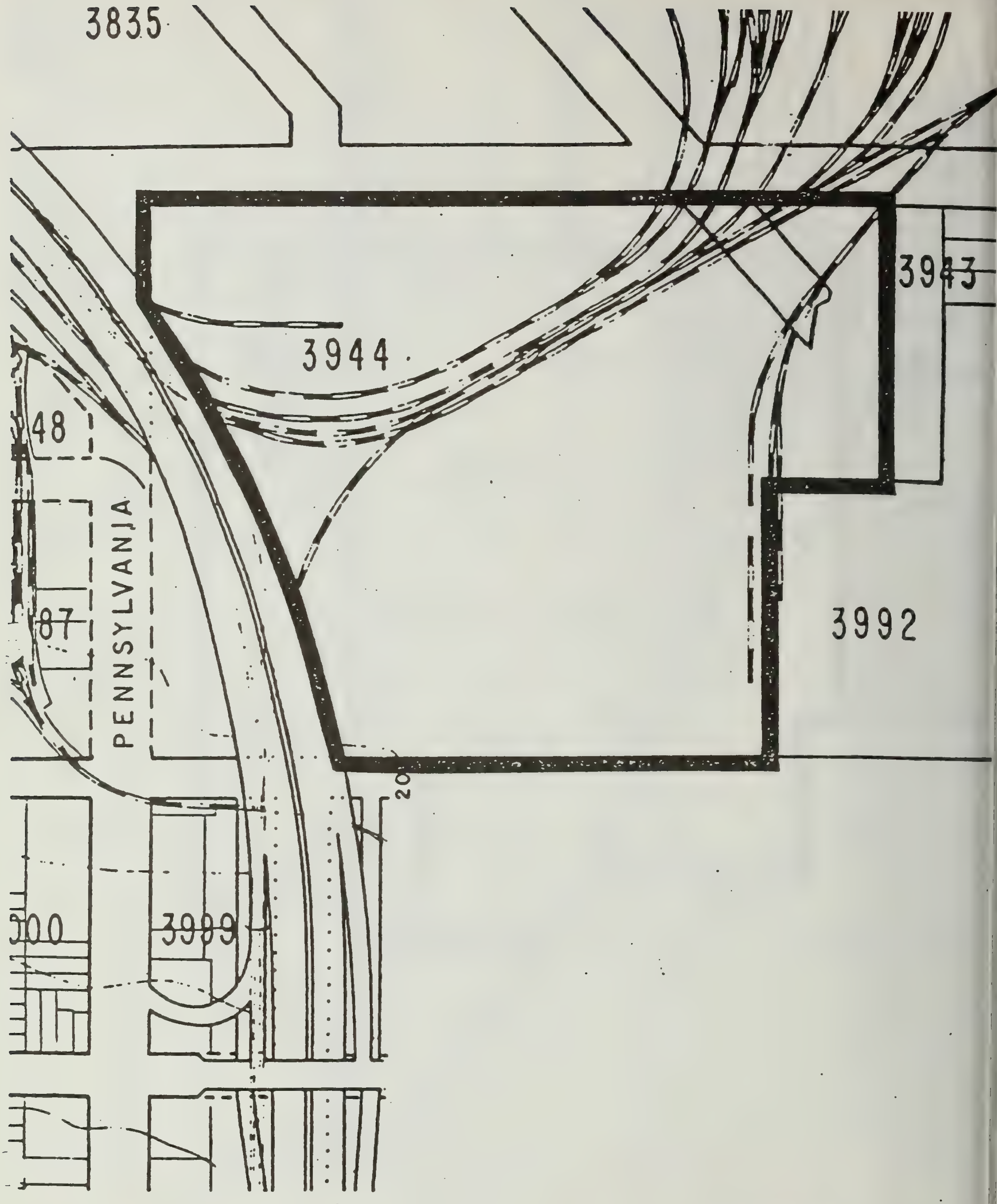
3849
3850
3851
EL DORADO ST.
THIRD
3853
3892
ST.
CHINA BASIN
3943
3942
3940
ST.
ST
3993
ILLINOIS

SITE 9

SITE09-1

_AND VALUE STUDY
SITE 9 (3RD/16TH)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	ILLINOIS ST R.O.W.	81760	0
----	----	3RD ST R.O.W.	16200	0
----	----	EL DORADO ST R.O.W.	83214	0
3853	1	INDUSTRIAL	70200	12000
	2	INDUSTRIAL	11880	0
3892	1	INDUSTRIAL	131600	50000
3940	1	INDUSTRIAL	160800	20000
	2	INDUSTRIAL	54000	0
3942	1	INDUSTRIAL	72000	25000
	X	INDUSTRIAL	11880	0
----	----	PORT PROPERTY	244000	0
TOTAL			937534	107000
		ACRES	21.52	

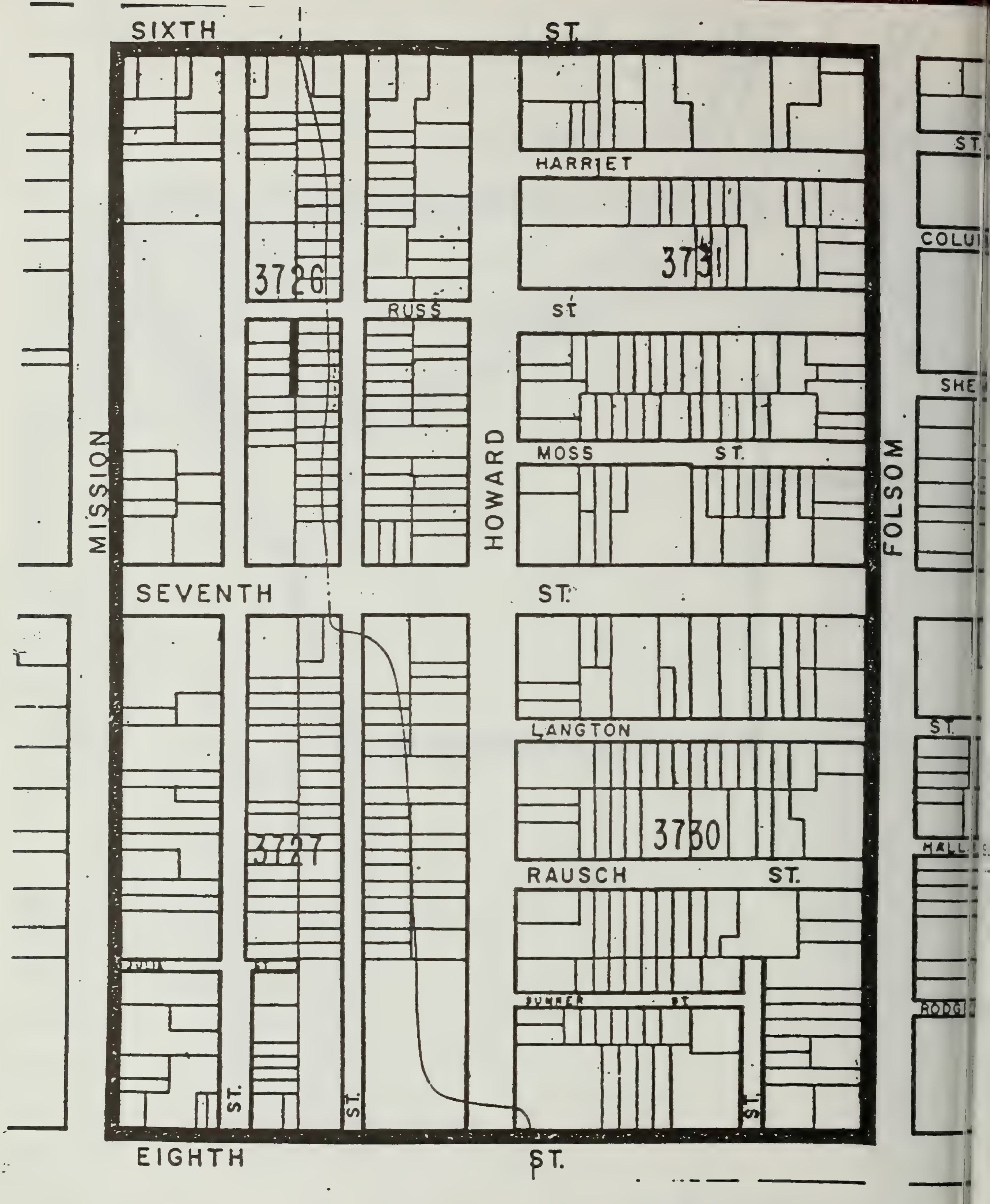


SITE 10

ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 10 (MISSION BAY)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	6TH ST R.O.W.	20450	0
3944	4	SP RAILYARDS/LEASED LAND	753400	200000
OTAL			773850	200000
		ACRES	17.77	


SIXTH ST.
HARRIET
3726
3731
RUSS
ST.
MOSS ST.
MISSION
HOWARD
FOLSOM
SEVENTH ST.
LANGTON
3730
3727
RAUSCH ST.
SUMNER ST
ST.
ST.
ST.
EIGHTH ST.
ST.
COLU
SHE
ST.
HALL
RODG

SITE 11

A. ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 11 (6TH TO 8TH/MISSION TO FOLSOM)

.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	HOWARD ST R.O.W.	142931	0
----	----	7TH ST R.O.W.	90750	0
----	----	MINNA ST R.O.W.	60775	0
----	----	NATOMA ST R.O.W.	57750	0
----	----	RUSS ST R.O.W.	50850	0
----	----	TULIP ALLEY R.O.W.	625	0
----	----	JULIA ST R.O.W.	4580	0
----	----	CLEMENTINA ST R.O.W.	9625	0
----	----	SUMNER ST R.O.W.	7633	0
----	----	RAUSCH ST R.O.W.	19250	0
----	----	LANGTON ST R.O.W.	19250	0
----	----	HARRIET ST R.O.W.	24750	0
----	----	MOSS ST R.O.W.	19250	0
SUBTOTAL			508019	0
3726	1	TAVERN DOWN/RESIDENTIAL ABOVE	1875	5625
	2	HENRY HOTEL + COMMERCIAL	4500	31500
	3	LAUNDROMAT	1875	1875
	4	PEOPLE'S PARK	5625	0
	100	PAVED PARKING	3750	0
	101	PAVED PARKING	5625	0
	103	PAVED PARKING	8090	0
	105	HOTEL + COMMERCIAL	6400	32000
	106	PRINT-OUT COMPANY	2125	4250
	107	LIQUOR STORE + COMMERCIAL	2975	8925
	108	MEDICAL SUPPLIES	3825	3825
	109	CHEVRON CAR WASH + PARKING	61215	7500
	110	AUTO CLINIC	16000	16000
	111	PAINT SUPPLIES	4000	8000
	112	PAWNBROKER	2125	2125
	113	PAVED PARKING	4250	0
SUBTOTAL			134255	121625
3726	5	RESTAURANT/PARTIALLY VACANT	2250	6750
	6	HOTEL PONTIAC	5750	22000
	7	VACANT LOT	3750	0
	8	UNITED HOTEL + COMMERCIAL	3750	7500
	57	RESIDENTIAL - 3 UNITS	1575	3300
	57A	COMMERCIAL	1575	1575
	58	RESIDENTIAL - 6 UNITS	2475	5200
	59	RESIDENTIAL - 3 UNITS	1875	4000
	60	RESIDENTIAL - 15 UNITS	1875	4000
	61	RESIDENTIAL - 4 UNITS	1875	2700
	62	KPOO RADIO STATION	1875	3750
	63	RESIDENTIAL - 4 UNITS	1875	2700
	64	RESIDENTIAL - 2 UNITS	1875	2700
	65	COMMERCIAL	2700	5400
	67	COMMERCIAL/RESIDENTIAL	2550	4000
	94	COMMERCIAL PARKING ($1.50/DAY)	9600	0
	95	COMMERCIAL PARKING ($1.25/DAY)	8000	2500
	96	RESIDENTIAL - 2 UNITS	2000	3000
	97	RESIDENTIAL - 5 UNITS	2000	3000
	98	VACANT RESIDENTIAL	2000	3000
SUBTOTAL			61225	87075

ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 11 (CONTINUED)

.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
3726	68	COMMERCIAL	1875	3750
	69	RESIDENTIAL - 4 UNITS	1875	3400
	70	RESIDENTIAL - 3 UNITS	1875	3400
	71	COMMERCIAL/RESIDENTIAL	1875	2200
	72	VACANT LOT	1875	0
	73	RESIDENTIAL - 5 UNITS	1875	2800
	74	RESIDENTIAL - 5 UNITS	1875	2200
	75	COMMERCIAL	1875	2500
	76	CITY REFRIGERATION	1875	3750
	77-80/114/117	AMERICANA MOTEL	28925	70000
	87	PAVED PARKING	2000	0
	88	RESIDENTIAL - 6 UNITS	2200	5200
	89	RESIDENTIAL - 3 UNITS	2000	5400
	90	TRANSMISSION REPAIRS	2550	2400
	91	RESIDENTIAL - 4 UNITS	1875	2800
	92	MEDICAL LABORATORY	1875	2200
	93	SOUTH OF MARKET HEALTH CENTER	3075	4600
SUBTOTAL			61375	116600
3726	9	COMMERCIAL/RESIDENTIAL	3375	10125
	10	COMMERCIAL/RESIDENTIAL	7350	44000
	11	VACANT BLDG	8730	35000
	12	ELECTRICAL SUPPLIES	3330	6660
	13/15	PAVED PARKING	13770	0
	17	OFFICE PRODUCTS COMPANY	2800	2500
	18	COMMERCIAL/RESIDENTIAL	2800	6900
	19	LITHOPLATE SERVICE	3600	3600
	46	RESDIENTIAL - 3 UNITS	2700	7300
	47	COFFEE SERVICE COMPANY	5395	5395
	50	PAVED PARKING	1875	0
	51	VACANT LOT	1875	0
	52	RESIDENTIAL - 2 UNITS	1875	3000
	53	RESIDENTIAL - 4 UNITS	1875	3000
	54	RESIDENTIAL - 4 UNITS	1875	3000
	55	RESIDENTIAL - 4 UNITS	1875	4500
SUBTOTAL			65100	134890

3. LAND VALUE STUDY
SITE 11 (CONTINUED)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
3726	20	AUDIO ENGINEER	4050	5400
	21	PAVED PARKING	1800	0
	22	COASTLINE COMPANY	5400	10800
	24	COMMERCIAL	2250	2250
	25	COMMERCIAL/RESIDENTIAL	2250	6750
	26	MACHINE SHOP	8250	16500
	27	COMMERCIAL/RESIDENTIAL	2250	6000
	28	PAINTING & DECORATING COMPANY	2083	4000
	29	COMMERCIAL/RESIDENTIAL	2250	6000
	30	AUDIO ENGINEER	2250	4500
	31	PAVED PARKING	2250	0
	32	COMMERCIAL/RESIDENTIAL	5400	16200
	33	VACANT LOT	1875	0
	34	RESTAURANT	1875	3750
	35	LIGHTING FIXTURES	1875	3750
	36	VACANT LOT	1875	0
	37	VACANT LOT	1875	0
	37A	VACANT LOT	1960	0
	38	RESIDENTIAL - 3 UNITS	1875	4600
	39	RESIDENTIAL - 4 UNITS	1875	4800
	40	RESIDENTIAL - 4 UNITS	1875	3000
	41	RESIDENTIAL - 1 UNIT	1875	1000
	42	PAVED PARKING	1875	0
	43	PAVED PARKING	1875	0
	44	PAVED PARKING	1875	0
	45	RESIDENTIAL - 6 UNITS	1875	5200
UBTOTAL			66818	104500
3727	1	HOTEL + COMMERCIAL	22125	75000
	89/91	AUTO REPAIR	15750	27750
	94	SEWING MACHINE EXCHANGE	4000	8000
	95	UNPAVED PARKING LOT	1875	0
	96	VACANT BUILDING	6125	8500
	97	COMMERCIAL	4000	1750
	98	PARKING LOT ($1.25/DAY)	6240	0
	101	COMMERCIAL	4000	8000
	102	LIGHTHOUSE FOR THE BLIND	4000	8000
	103	COMMERCIAL	12000	64000
	125	COMMERCIAL	4500	9000
UBTOTAL			84615	210000
3727	108	COMMERCIAL/RESIDENTIAL	3200	8600
	109	COMMERCIAL	9600	19200
	113	COMMERCIAL/RESIDENTIAL	1430	2860
	114	OFFICE MACHINES	1170	2340
	117	PARKING LOT	1600	0
	118	COMMERCIAL	3200	3200
	120	COMMERCIAL	8000	32000
	134	PARKING LOT	2600	0
	135	PG & E SUBSTATION	10000	10000
UBTOTAL			40800	78200

A. ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 11 (CONTINUED)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
3727	2	CARRIAGE INN MOTEL & PARKING	8000	32000
	4	DEADLINE PRINTING	3750	3750
	5	COMMERCIAL	3750	3750
	43	COMMERCIAL	1875	1875
	44	RESIDENTIAL - 4 UNITS	1875	5000
	45	RESIDENTIAL - 4 UNITS	1875	3200
	46	RESIDENTIAL - 3 UNITS	1725	3200
	47	RESIDENTIAL - 4 UNITS	2025	5400
	48	RESIDENTIAL - 4 UNITS	1875	3200
	49	COMMERCIAL	1875	5000
	50	RESIDENTIAL - 3 UNITS	1875	5000
	51	RESIDENTIAL - 3 UNITS	1875	5000
	52	COMMERCIAL	1875	5000
	53	VACANT RESIDENTIAL	1875	5000
	54	RESIDENTIAL - 4 UNITS	3750	6000
	56	RESIDENTIAL - 4 UNITS	1875	3000
	57	COMMERCIAL	1875	3750
	58	RESIDENTIAL - 2 UNITS	1875	3000
	59	RESIDENTIAL - 4 UNITS	1875	3000
	60	COMMERCIAL	1875	3000
	61/62	COMMERCIAL	22120	41250
	63	COMMERCIAL	2990	5980
	64	PAINTING & DECORATING COMPANY	1380	2500
	65	MACHINE SHOP	1380	1250
	65A	RESIDENTIAL - 2 UNITS	1380	2500
	66	RESIDENTIAL - 2 UNITS	1380	2500
	67	PARKING LOT	4140	0
	70	RESIDENTIAL - 6 UNITS	3450	6600
	71	COMMERCIAL	2000	2000
	72A	COMMARCIAL PARKING ($2.00/DAY)	4000	0
	72	RESIDENTIAL - 3 UNITS	2000	4500
	73	RESIDENTIAL - 4 UNITS	2000	3500
	74	RESIDENTIAL - 4 UNITS	2000	3000
	75	RESDIENTIAL - 3 UNITS	2000	5000
	76/77	COMMERCIAL/RESIDENTIAL	4600	3200
	78	RESIDENTIAL - 2 UNITS	1600	2600
	83	COMMERCIAL	2000	4000
	84	RESIDENTIAL - 4 UNITS	2000	3400
	85	RESIDENTIAL - 4 UNITS	2000	3400
	86	RESIDENTIAL - 12 UNITS	2000	5200
	136	COMMERCIAL PARKING ($1.25/DAY)	7800	0
SUBTOTAL			123470	210505

3. LAND VALUE STUDY
SITE 11 (CONTINUED)

.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
3730	14	WAREHOUSE	4000	8000
	15	LIGHTING SUPPLIES	14600	14600
	75-80	PARKING LOT	18200	1400
	82	VACANT BUILDING	8400	16800
	84	CHILD CARE CENTER	2800	5000
	85	RESIDENTIAL - 3 UNITS	2800	5000
	86	RESIDENTIAL - 3 UNITS	2800	5000
	87	RESIDENTIAL - 3 UNITS	2800	5000
	88	COMMERCIAL/RESIDENTIAL	5600	11200
	89	VACANT BUILDING	2800	5600
	90	SHIPPING COMPANY	2800	5600
	91	CITY PARK/PLAYGROUND	9375	0
	93	RESIDENTIAL - 2 UNITS	1875	2500
	94	RESIDENTIAL - 6 UNITS	1875	4500
	95	COMMERCIAL	1875	1600
	96	CONTRACTOR	1875	0
	97	RESIDENTIAL - 2 UNITS	1875	3500
	98	RESIDENTIAL - 4 UNITS	1875	3500
	99	VACANT LOT	1875	0
	100	RESIDENTIAL - 3 UNITS	1875	3600
	101	RESIDENTIAL - 3 UNITS	1875	4500
	102	RESIDENTIAL - 4 UNITS	1875	3600
	103	UNPAVED PARKING	1875	0
	104/105	GRAPHICS COMPAN	5250	10500
SUBTOTAL			102850	121000
3730	18	ELECTRIC COMPANY	5000	8000
	19	PLATING COMPANY	3400	4500
	20-24	APPAREL MANUFACTURER	18800	16000
	25	FENCING SUPPLY COMPANY	4000	8000
	26	COMMERCIAL	4250	6400
	27	COMMERCIAL	4000	9000
	28	COMMERCIAL/RESIDENTIAL	6000	12000
	29	IMPORT COMPANY	6000	18000
	30	PARKING LOT	1875	0
	31	RESIDENTIAL - 3 UNITS	1875	3200
	49/51	PARKING LOT	6090	0
	53	ELECTRIC COMPANY	1450	2900
	54	RESIDENTIAL - 1 UNIT	1450	1200
	55	RESIDENTIAL - 2 UNITS	1450	2500
	56	RESIDENTIAL - 3 UNITS	1450	1250
	57	VACANT LOT	1450	0
	58	VACANT BUILDING	1450	2500
	59	ST VINCENT DEPAUL	5800	11600
	60	IMPORT COMPANY	8400	14000
	61	RESIDENTIAL - 12 UNITS	5600	12600
	63	RESIDENTIAL - 3 UNITS	2800	5000
	64	RESIDENTIAL - 6 UNITS	2800	5000
	65	RESIDENTIAL - 6 UNITS	2800	5000
	66	COMMERCIAL/RESIDENTIAL	2800	5000
	67	RESIDENTIAL - 3 UNITS	2800	5000
	68	RESIDENTIAL - 2 UNITS	2800	2200
	69	VACANT LOT	2800	0
	70/72	COMMERCIAL	16900	33600

A. ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 11 (CONTINUED)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
3730	32	CALIFORNIA PRINTING	13661	28000
	34/35	BINDING COMPANY	7219	9000
	36	PARKING LOT	4125	0
	37	PARKING LOT	3781	0
	38	CLUB BATHS	18906	21000
	39	SEQUOIA PRESS	2250	4000
	40	COMMERCIAL	2100	4200
	40A	RESIDENTIAL - 2 UNITS	1450	2500
	41	RESIDENTIAL - 2 UNITS	1450	2500
	42	RESIDENTIAL - 3 UNITS	1450	2500
	43	RESIDENTIAL - 1 UNIT	1450	3500
	44	RESIDENTIAL - 2 UNITS	1450	2600
	45	RESIDENTIAL - 2 UNITS	1450	2600
	46	RESIDENTIAL - 6 UNITS	2900	5000
	48	PARKING LOT	5760	0
SUBTOTAL			69402	87400
3731	1	COMMERCIAL/RESIDENTIAL	10000	35000
	2	COMMERCIAL/RESIDENTIAL	3875	7500
	3	COMMERCIAL/RESIDENTIAL	4000	11500
	4	AUTO REPAIR	9625	19250
	10	VACANT LOT	7875	0
	11	BAR	2250	2250
	12	COMMERCIAL	13125	13125
	111	VACANT LOT	21375	0
	113	RESIDENTIAL - 7 UNITS	3750	9500
	115	RESIDENTIAL - 6 UNITS	1875	3000
	116	RESIDENTIAL - 1 UNIT	1500	2800
	117	COMMERCIAL/RESIDENTIAL	6000	18000
SUBTOTAL			85250	121925
3731	15	COMMERCIAL	5550	5000
	18	CONTRACTOR	2000	2000
	19	PARK HOTEL	4000	12000
	20	AUTO SUPPLY	2000	4000
	88	VACANT RESIDENTIAL	3033	7500
	89	COMMERCIAL	13658	13500
	91	RESIDENTIAL - 6 UNITS	3000	7500
	92	RESIDENTIAL - 6 UNITS	2500	6000
	93	RESIDENTIAL - 3 UNITS	2500	5000
	94	COMMERCIAL	28000	75000
	95	UNION HALL	13184	18000
	99	COMMERCIAL	3691	7400
	101/102	PARKING LOT	3750	0
	103	RESIDENTIAL - 2 UNITS	1875	4500
	104	RESIDENTIAL - 3 UNITS	1913	4500
	105	RESIDENTIAL - 2 UNITS	1838	4500
	109	RESIDENTIAL - 2 UNITS	1725	4500
	110	RESIDENTIAL - 6 UNITS	2025	4500
SUBTOTAL			96242	185400

3. LAND VALUE STUDY
SITE 11 (CONTINUED)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
3731	21	COMMERCIAL/RESIDENTIAL	5000	7500
	23	VACANT BUILDING	2000	2500
	24	COMMERCIAL	4540	13620
	26	COMMERCIAL	2000	4000
	27	COMMERCIAL	1960	3920
	58	INDUSTRIAL STORAGE	5625	0
	60	RESIDENTIAL - 2 UNITS	1800	3000
	61	RESIDENTIAL - 2 UNITS	1800	3000
	62	RESIDENTIAL - 2 UNITS	1800	3000
	62A	RESIDENTIAL - 6 UNITS	2250	4200
	63	RESIDENTIAL - 3 UNITS	1350	2500
	66	RESIDENTIAL - 4 UNITS	1875	3000
	67	RESIDENTIAL - 2 UNITS	1875	2000
	68	COMMERCIAL	1875	1875
	69	RESIDENTIAL - 2 UNITS	1875	3000
	70	RESIDENTIAL - 2 UNITS	1875	3000
	71	ENGRAVING COMPANY	3750	7500
	72	RESTAURANT EQUIPMENT	6515	12000
	73	COMMERCIAL/RESIDENTIAL	2125	4250
	74	COMMERCIAL	4250	8500
	76	RESIDENTIAL - 4 UNITS	1913	3500
	77	COMMERCIAL	4942	9800
	78	COMMERCIAL	2500	5000
	79	RESIDENTIAL - 4 UNITS	2500	4000
	80	INDUSTRIAL STORAGE	2500	0
	81	COMMERCIAL	2500	5000
	82	RESIDENTIAL - 6 UNITS	3000	7500
	83	RESIDENTIAL - 6 UNITS	3000	7500
	84	COMMERCIAL	5000	9000
	86	COMMERCIAL	4000	4000
	87	COMMERCIAL	4500	1500
	119	COMMERCIAL	3750	7500
SUBTOTAL			96245	156665
3731	30	COMMERCIAL	6400	1500
	31	COMMERCIAL	8000	12000
	33	MOTEL	5760	17280
	35/37	PARKING LOT	22260	1500
	40	MACHINE SHOP	4125	5500
	41	HOTEL + COMMERCIAL	2250	6000
	42	LIGHTHOUSE FOR THE BLIND	11700	35000
	43	COMMERCIAL	4800	9600
	44	RESIDENTIAL - 4 UNITS	1875	3200
	46	RESIDENTIAL - 4 UNITS	1875	3200
	52	RESIDENTIAL - 3 UNITS	1920	4500
	53	RESIDENTIAL - 3 UNITS	1920	4500
	54	RESIDENTIAL - 3 UNITS	1920	4500
	54A	RESIDENTIAL - 6 UNITS	1920	4500
	55	RESIDENTIAL - 1 UNIT	2000	3600
	122	ELEVATOR COMPANY	2000	6000
	124	COMMERCIAL	2000	2000
	125	VACANT RESIDENTIAL	4400	13200
SUBTOTAL			87125	137580

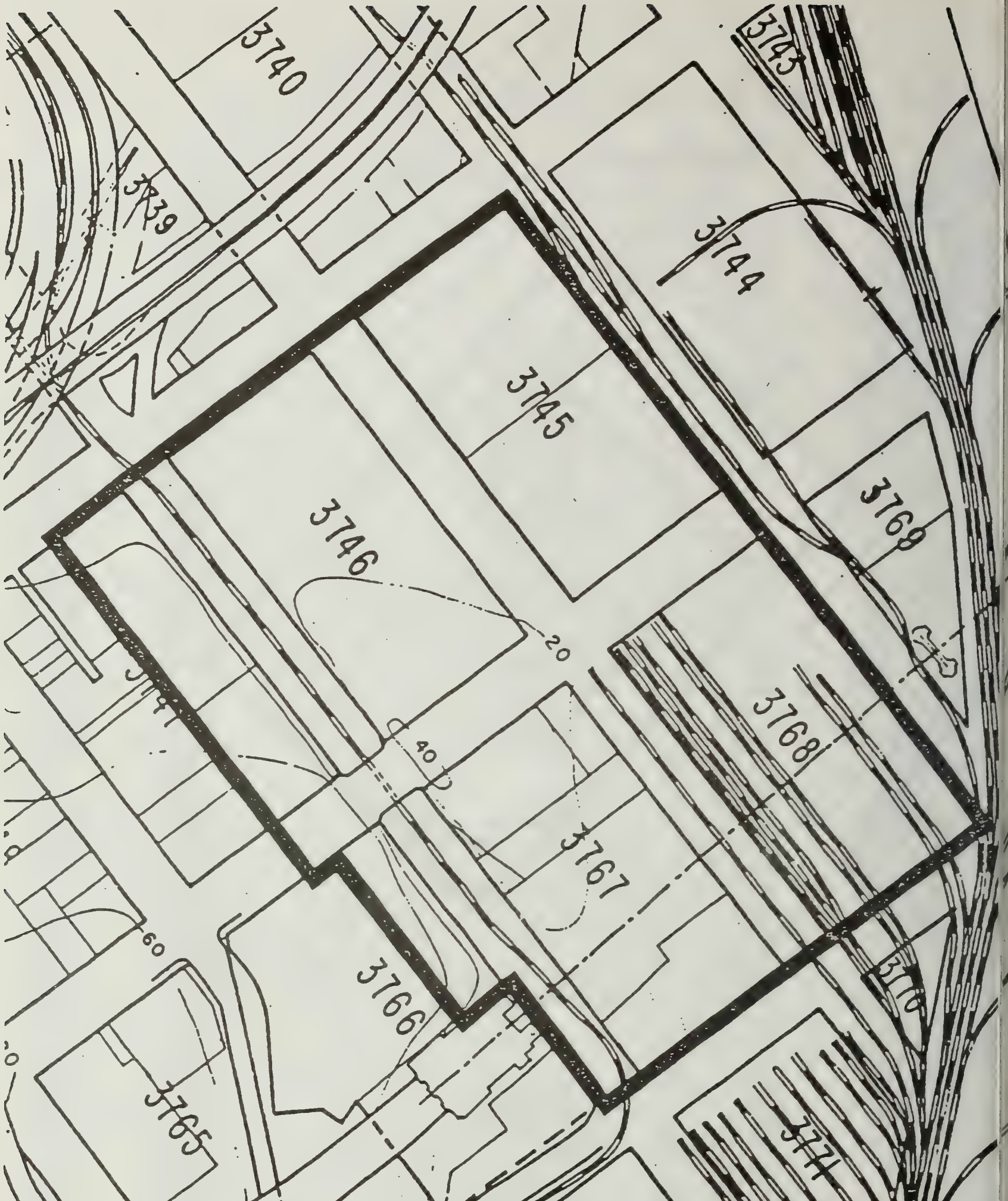

CENTER
SOUTH PARK AVE
3782
3776
ZOE
ST.
ST
3787
WELSH
3777
FREELON
TOWNSEND

SITE 12

A. ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 12 ~~(MISSION BAY)~~

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	RITCH ST R.O.W.	19250	0
----	----	ZOE ST R.O.W.	19250	0
----	----	WELSH ST R.O.W.	15400	0
----	----	FREELON ST R.O.W.	15400	0
3944	4	PAVED PARKING LOT	9250	0
	5	EAST-WEST LEATHERS	11730	17600
	7	COMMERCIAL - 3 TENANTS	2400	4800
	8	RESIDENTIAL - 100 UNITS	21600	64800
	11	COMMERCIAL - 3 TENANTS	5880	11760
	15	COMMERCIAL - 2 TENANTS	1875	3750
	16	COMMERCIAL - 2 TENANTS	7500	22500
	19	COMMERCIAL - 3 TENANTS	5600	11200
	20	COMMERCIAL - 3 TENANTS	3990	6000
	21	COMMERCIAL - 2 TENANTS	4810	9620
	24	VACANT LOT	2000	0
	25	UNITED CALIF BRANCH BANK	36000	10000
	27	ATLAS HEATING & VENTILATION	4125	8250
	28	PICTURES PLUS	3875	2600
	30	VACANT BLDG & LOT	4400	1600
	32	DECORATIVE PLANT SERVICE	2800	2000
	34	MARINA AUTO BODY	11100	15000
	38/39	JAMES AUTO SALVAGE	6000	0
	40	EARL SCHIEB AUTO BODY	9200	18400
	41	VACANT BLDG	20000	80000
	42/43	PIPE YARD	3200	0
	44	NICK'S AUTO REPAIR	3210	3210
	49	COMMERCIAL - 3 TENANTS	2400	4800
	50/52	STANDARD MECHANICAL COMPANY	34800	40800
	57-61	VACANT PAVED LOT	11600	0
	62	BERWICK EXTRACTION COMPANY	6600	9000
	63	PAVED PARKING LOT	4600	0
	77	JOHN ALLEN COMPANY	2000	2000
	80	APERSEY COMPANY	8800	12000
	85	PACIFIC TELEPHONE PARKING	26900	0
	88-91	CHARLES JONES CONSTRUCTION	7050	5100
	92	VACANT BLDG	4130	4130
	92A	COMMERCIAL - 3 TENANTS	7500	9900
	93	VACANT LOT	1500	0
	94	COMMERCIAL - 4 TENANTS	10310	14800
	98	COMMERCIAL - 2 TENANTS	1875	3750
	99	COMMERCIAL - 3 TENANTS	3750	7500
	100	RESIDENCE - 1 UNIT	1875	2800
	101-2	VACANT LOT	4500	0
	105	RESIDENCE - 1 UNIT	1875	2500
	106	VACANT RESIDENCE - 1 UNIT	1875	2500
	113	US POST OFFICE BRANCH	7200	6000
	114	COMMERCIAL - 6 TENANTS	5320	10640
	115	COMMERCIAL - 14 TENANTS	31810	160000
	117	U-JIN ENTERPRISES	10000	20000
	118	SCHUBERTH BOOKBINDERY	2400	4800
TOTAL			450515	616110



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3743
3739
3744
3745
3746
3769
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3768
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3767
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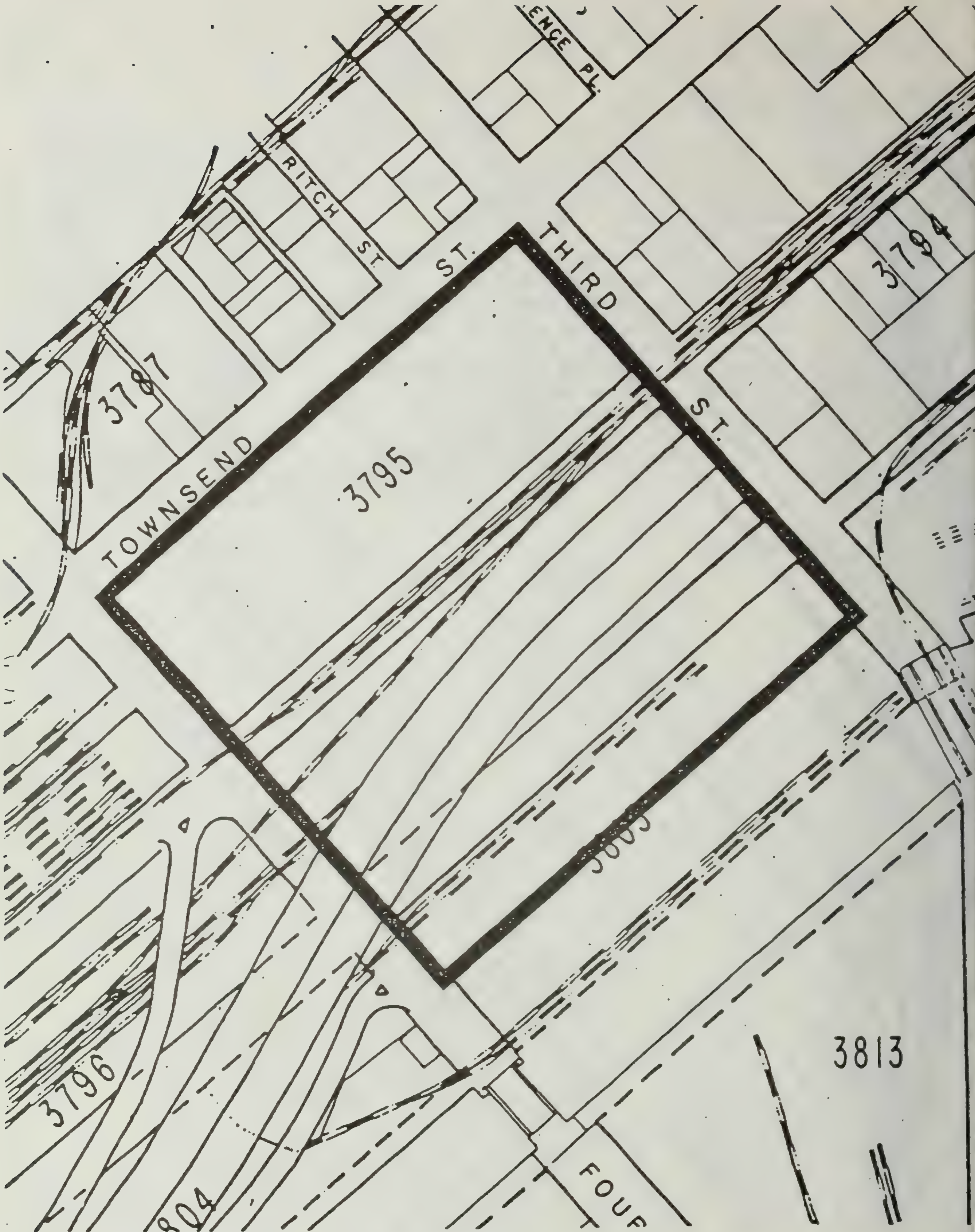
3766
3770
3765
3771

SITE 13

A. ALTERNATIVE SITE SEARCH - PHASE I

3. LAND VALUE STUDY
SITE 13 (RINCON HILL)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	HARRISON ST R.O.W.	70330	0
----	----	MAIN ST R.O.W.	90750	0
----	----	BEALE ST R.O.W.	90750	0
3745	1	GOLDEN GATE TRANSIT (OWNED BY STATE)	75625	1500
"	2	US FEDERAL RECORDS CENTER	75625	450000
3746	1	US POST OFFICE FREIGHT HANDLING	151250	500000
3747	1	COMMERCIAL PARKING LOT ($1.00/DAY)	29563	0
"	1B	VACANT INDUSTRIAL BLDG	46063	140000
3766	5	COMMERCIAL PARKING LOT ($1.50/DAY)	38300	0
3767	1A/12	CHRISTIE MACHINE WORKS	36960	20000
"	13	STATE R.O.W. (EMBANKMENT)	3040	0
"	3/4	CALTRANS MAINTAINENCE YARD	94530	8000
3768	1	MULTI-TENANT WAREHOUSE STRUCTURE	151250	380000
TOTAL			954036	1499500
		ACRES	21.90	


ENCE PL.
RITCH ST.
THIRD ST.
TOWNSEND ST.
FOUR
3787
3795
3794
3796
3813
804

SITE 14

SITE14-1

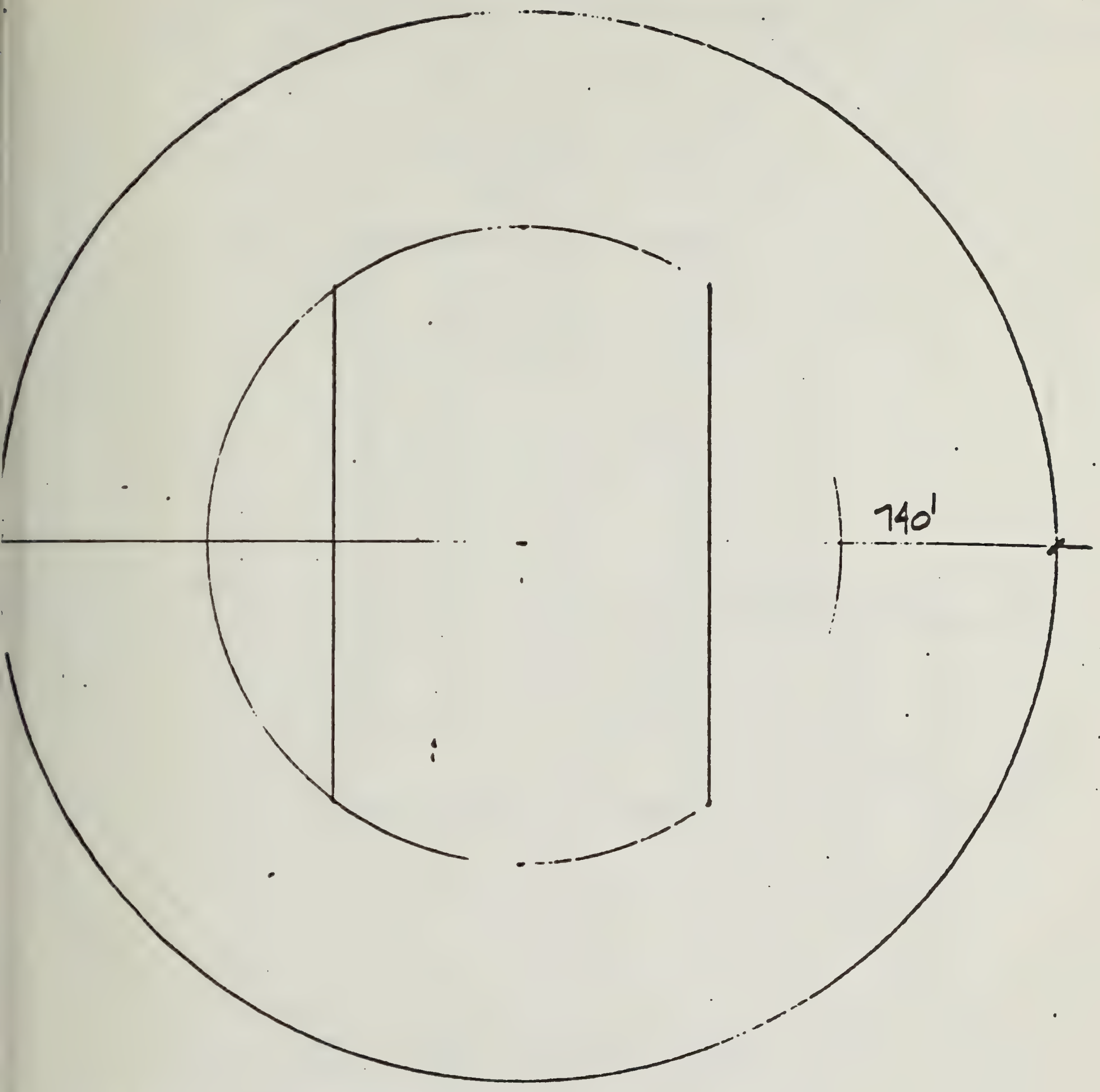
_AND VLAND VALUE STUDY
SITE 14 (MISSION BAY)

C.B.	PARCEL	DESCRIPTION	LOT AREA	BLDG AREA
----	----	KING ST R.O.W.	61250	0
----	----	BERRY ST R.O.W.	68063	0
3795	1	RV PARK	113438	0
"	2	I-280 AIR RIGHTS/PARKING	198000	0
	3	RV PARK	113438	0
3803	5	CHINA BASIN BLDG PARKING	82500	0
TOTAL			636689	0
		ACRES	14.62	

APPENDIX C

Stadium Footprints

Received 2/8

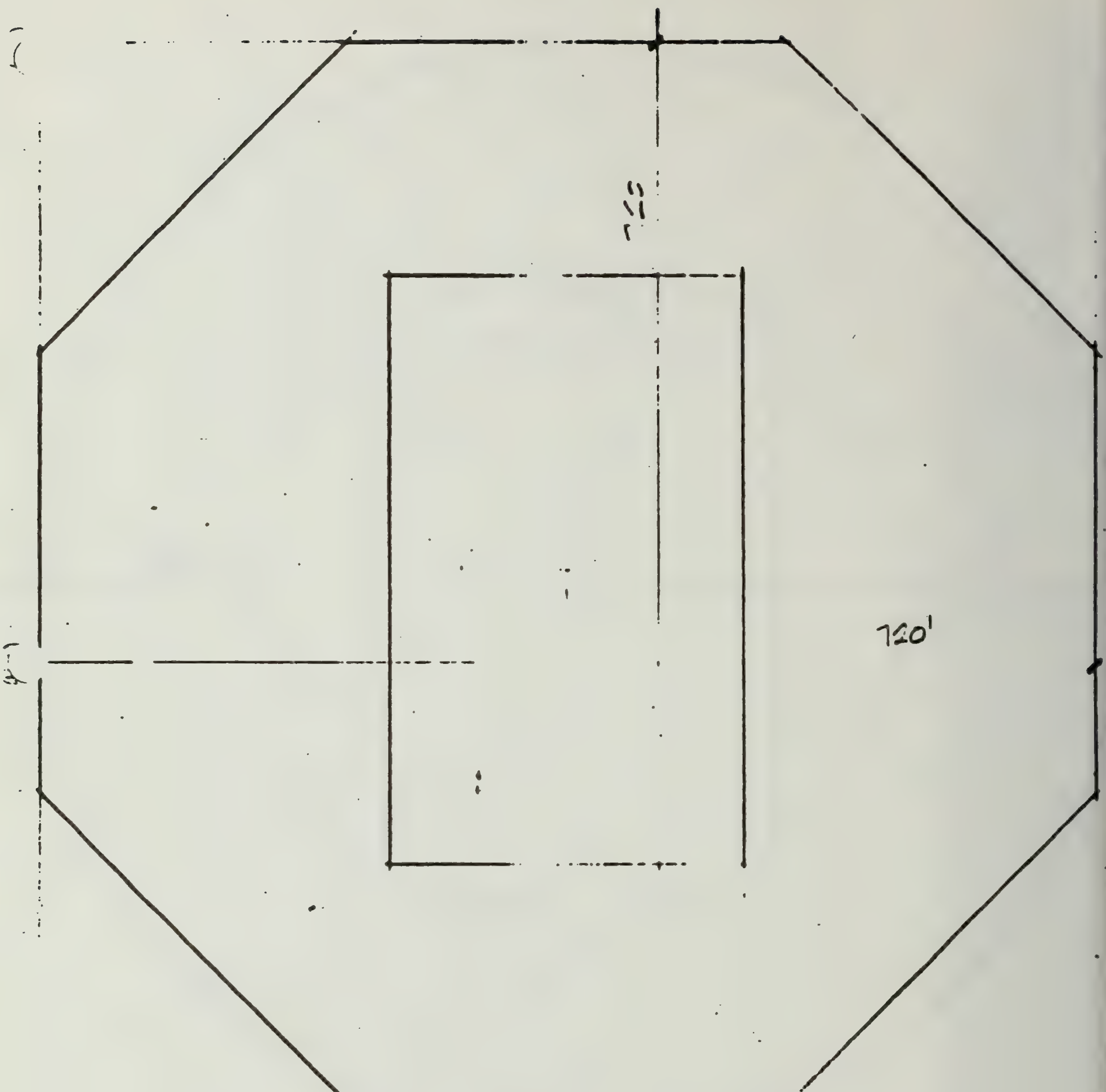


CIRCLE

HNTB

JOB NO
DATE:
REVISED:

STADIUM FOOTPRINT

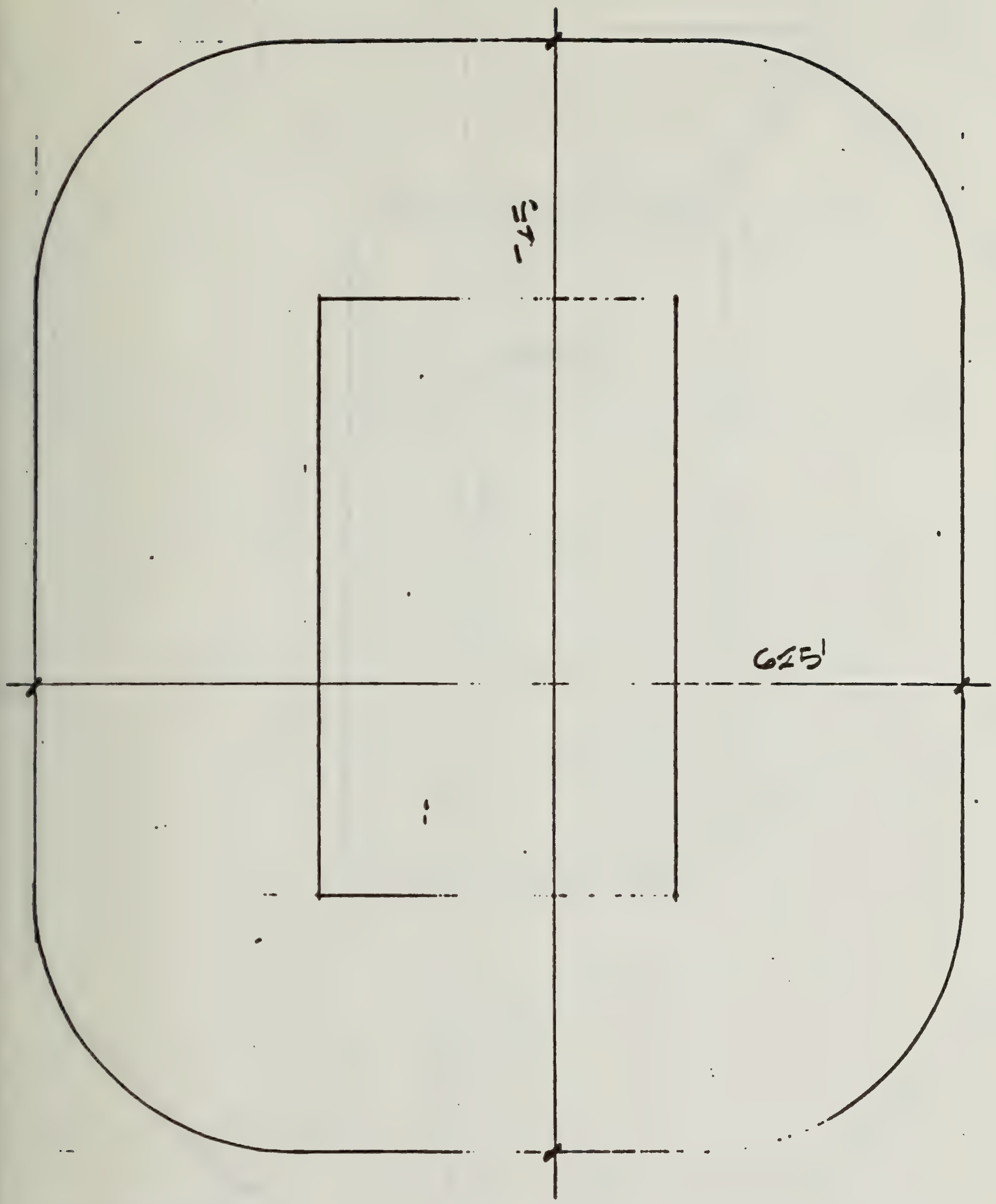


OCTAGON/OCTARAD

HNTB
HOWARD
NEEDLES
TAMMEN
& BERGENDOFF
KANSAS CITY, MISSOURI

JOB NO:
DATE:
REVISED:

STADIUM FOOTPRINT

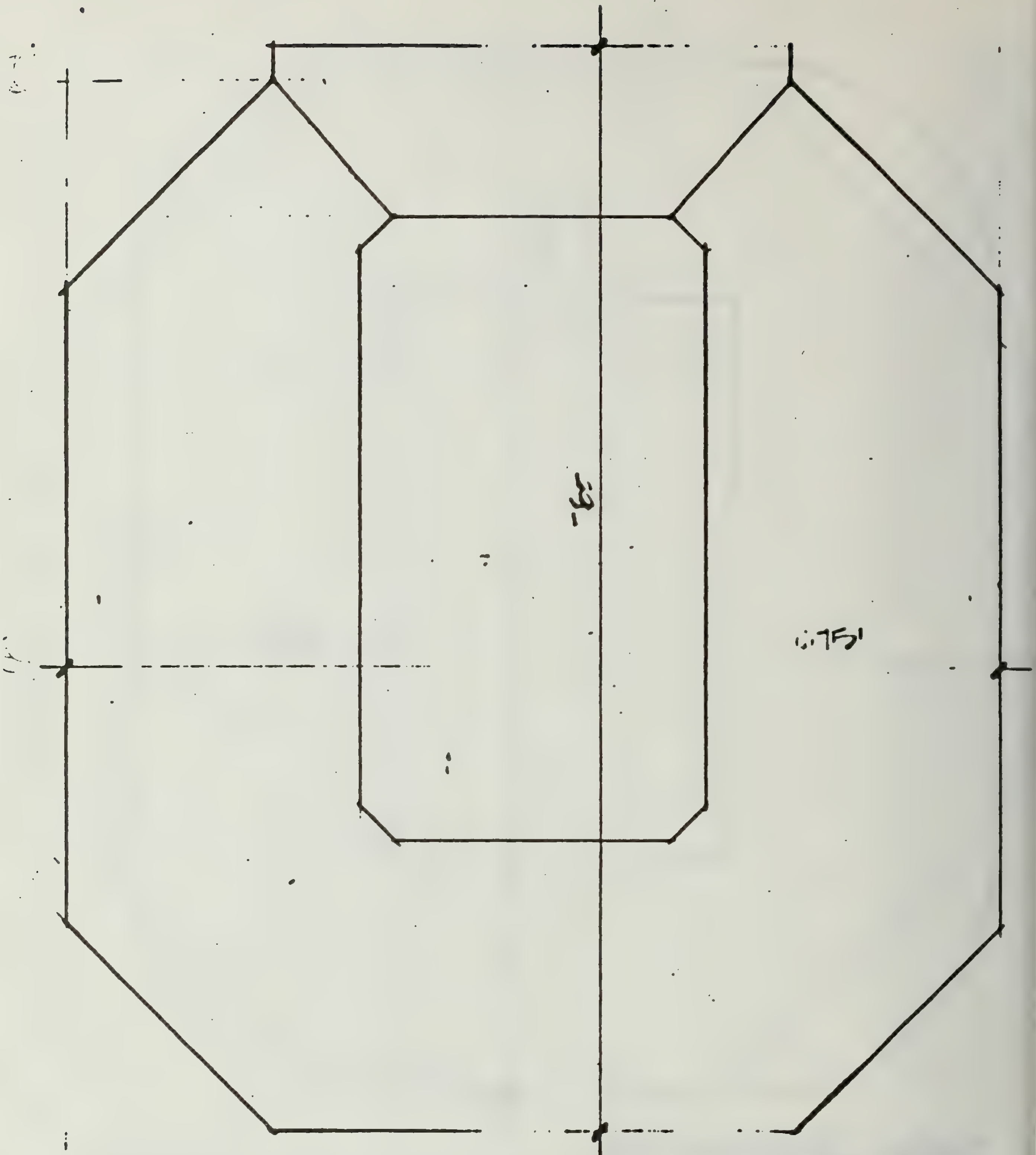


RECTANGLE/SUPER ELIPSE

HNTB

JOB NO.
DATE
REVISED.

STADIUM FOOTPRINT



HORSESHOE

HNTB

HOWARD
NEEDLES
TAMMEN
& BERGENDOFF

KANSAS CITY MISSOURI

JOB NO.
DATE.
REVISED.

STADIUM FOOTPRINT

APPENDIX D

Geotechnical Site Evaluation Reports

Our rating of each site is presented below.

Site No.	Rating	Site No.	Rating
1	1	8	1
2	4	9	1
3	4	10	3
4	3	11	2
5	2	12	4
6	1	13	2
7	3	14	3

We have attached summaries of the soil conditions and brief discussions of the foundation, dewatering and shoring considerations of each site.

Please call if you have any questions.

Yours very truly,

Thomas J. Stimac

Thomas J. Stimac
Civil Engineer - 23222
Harding Lawson Associates/
GeoResources Consultants

TJS/JER/cg

cc: HNTB-CTMA-Geiger Berger
Attention: Mr. Don Crosby

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 1

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sandy Fill	0-45
Soft Bay Mud	45-100
Dense Sand	100-130
Old Bay Clay	130-145

The above conditions are anticipated near central portion of site.

Bedrock slopes upward toward the 11th Street/Bryant Street intersection to a depth of 30 feet.

Depth to ground water level is approximately 12-14 feet.

REMARKS:

FOUNDATION SUPPORT: Pile support necessary due to presence of Bay Mud and generally variable soil conditions.

DEWATERING: Permanent dewatering required for a 40-foot depressed field. Approximately 25 feet of drawdown will be required. High ground water flows likely due to clean sand fill blanketing the site.

SHORING: Several conventional systems possible; soldier pile and lagging or sheet piling possible. Bay Mud may exist at base of excavation and would have low lateral resistance.

EXCAVATABILITY: Conventional excavation methods appropriate. Excavated material could be used as fill.

OVERALL RATING: 1

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 2

ANTICIPATED SOIL CONDITIONS:

A few feet of fill covers site with serpentine rock immediately beneath the fill. The serpentine is highly weathered with low hardness.

No ground water data available.

REMARKS:

FOUNDATION SUPPORT: Conventional shallow foundations such as mat.

DEWATERING: Little dewatering during construction. Inadequate data to assess long-term requirements.

SHORING: Possible open cut slopes; inclination on rock strength and fractures.

EXCAVATABILITY: Conventional ripping. Excavated materials may be reused.

OVERALL RATING: 4

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 3

ANTICIPATED SOIL CONDITIONS:

Fill consisting of crushed serpentine and other materials 5 to 20 feet thick at southeast corner of site. Fill thickness in other areas of site should be less. Underlying material consists of approximately 10 feet of stiff residual soil overlying weathered serpentine. Water level observed 25 feet deep at southeast corner; may be shallower elsewhere.

REMARKS:

FOUNDATION SUPPORT: Conventional shallow foundations such as mat or footings.

DEWATERING: Necessary to drawdown water table from 25 to about 40 feet for both construction and long-term. Dewatering probably not very difficult due to presence of low permeable in materials below water level.

SHORING: Depending on stadium location, open cutting in weathered serpentine or soldier pile and lagging with tiebacks or other conventional method in soil above serpentine.

EXCAVATABILITY: Conventional excavation methods. Excavated materials could be reused.

OVERALL RATING: 4

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 4

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sandy Fill	10-20
Bay Mud (maximum depth about 40 feet)	7-20
Firm Sands and Clays	15-45

Bedrock depths on the order of 50 to 70 feet.

Ground water observed at 10 feet in general vicinity. May be expected at 2 to 7 feet deep depending on site topography.

REMARKS:

FOUNDATION SUPPORT: Mat foundation likely in dense sand or rock at greater than 40 feet deep.

DEWATERING: Dewatering necessary to drawdown from 35± feet. Ground water flow should be significant due to proximity of the China Basin Channel and presence of clean sands.

SHORING: Tied back sheet pile shoring system feasible; however, presence of weak soils in upper 20± feet may necessitate internally braced system. Dense soils at excavation level should provide adequate lateral resistance.

EXCAVATABILITY: Material may be excavated by conventional methods. Bay Mud not reusable; other materials could be reusable as fill.

OVERALL RATING: 3

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 5

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sandy Fill (medium dense)	10-20
Soft Bay Mud	20-60
Firm Alluvial Sands and Clays	10-60+

Bedrock depths vary from 80 feet to as shallow as 45 feet at corner of 7th and Hubbell Streets.

Ground water level approximately 5 feet deep; could vary from 2 to 10 feet.

REMARKS:

FOUNDATION SUPPORT: Deep foundation (probably driven piles) deriving support in alluvial soils. Uplift due to hydrostatic pressures may be resisted by frictional resistance. Firm soils may be encountered at depths of about 10 feet below excavation grade depending on location.

DEWATERING: Necessary to drawdown water level 30± feet. Ground water flow significant due to granular nature of fill and proximity of China Basin Channel.

SHORING: Adverse soil conditions for a deep excavation. Lateral resistance can be derived from firm sands and clays below excavation bottom.

EXCAVATABILITY: Material may be excavated by conventional methods. Bay Mud not reusable; other material would be usable as fill.

OVERALL RATING: 2

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 6

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sandy Fill (medium dense)	10-35
Soft Bay Mud (over most of the site; decreases to 30 feet thick towards 6th Street)	80-100
Firm Alluvial Sands and Clays	50-100+

Ground water level about 3 feet below ground surface; could vary from 2 to 10 feet deep.

REMARKS:

FOUNDATION SUPPORT: Deep foundation (driven piles) support necessary. Support may be derived below a depth of 120 feet. Uplift resisted by frictional resistance of piles in Bay Mud or additional penetration of piles into firm alluvial soils. Firm soils may be encountered at depths of 10 feet below excavation grade, depending on location.

DEWATERING: Could get high ground water flows likely through fill due to granular nature. Fine grained material below fill will allow little seepage during construction. Permanent dewatering required. Settlement of surrounding structures may occur as a result of prolonged dewatering.

SHORING: Adverse soil conditions for a deep excavation.

EXCAVATABILITY: Conventional excavation methods may be used. Bay Mud not reusable; existing fill may be reused.

OVERALL RATING: 1

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 7

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sandy and Clayey Fill	20-30
Bay Mud	20 (15 feet near King Street)
Firm Sands and Clays	10-150 (10 feet near King, 150 feet near Embarcadero)

Bedrock 60 feet deep near King Street and 200 feet deep near the Embarcadero.

Water levels less than 10 feet below grade.

REMARKS:

FOUNDATION SUPPORT: Mat foundation possible since firm sands and clays exist at about 40 feet deep. High hydrostatic uplift pressures may require hold downs or subdrain system.

DEWATERING: Large ground water flows should be anticipated due to proximity to S.F. Bay and seawall. Excavation dewatering difficult and expensive. Need to drawdown water table about 35 feet.

SHORING: Shoring could be a major construction cost. Slurry wall (internally braced) may be feasible to provide relatively watertight system. Other systems may be appropriate depending on dewatering approach.

EXCAVATABILITY: Conventional methods are appropriate. Bay Mud not reusable; fill may be reused.

OVERALL RATING: 3

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 8

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sands and Clayey Fill	20-30
Bay Mud	40-80
Firm Sands and Clays	30-100

Bedrock at depth of 150 to 200± feet.

Water levels at 10 feet deep or less.

REMARKS:

FOUNDATION SUPPORT: Pile supported foundation most likely. Piles would derive frictional support by penetrating firm sands and clays. Uplift pressures could be resisted by pile friction or eliminated by a subdrain system.

DEWATERING: Dewatering necessary to drawdown ground water level from 10 to 45 feet deep. Large ground water flows should be anticipated due to proximity of seawall and S.F. Bay.

SHORING: Shoring a major construction cost due to fill and Bay Mud thickness and proximity of seawall and S.F. Bay. Poor lateral resistance at excavation level.

EXCAVATABILITY: Conventional excavation methods are possible; some existing fill may be reused, but Bay Mud should be wasted.

OVERALL RATING: 1

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 9

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Fill (data very limited)	20-30
Bay Mud	30-90
Firm Sands and Clays	30-100

Bedrock depths: 80 to 200 feet.

Ground water level about 10 feet deep.

REMARKS:

FOUNDATION SUPPORT: Pile support likely due to variable thicknesses of Bay Mud to about 90 feet deep. Uplift pressures could be resisted by frictional resistance between piles and adjacent soil.

DEWATERING: Dewatering necessary to drawdown from 10 to 45 feet deep. Large ground water flows should be anticipated due to proximity of seawall and S.F. Bay. Permanent dewatering would be difficult to reduce uplift pressures.

SHORING: Shoring a major construction cost due to the presence fill and Bay Mud and proximity of the site to seawall and S.F. Bay. Poor lateral resistance at the excavation level.

EXCAVATABILITY: Conventional excavation methods appropriate; fill may be reused, but Bay Mud should be wasted.

OVERALL RATING: 1

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 10

ANTICIPATED SOIL CONDITIONS:

Limited data available

Southeast portion of site consists primarily of undifferentiated quaternary deposits of sands and clays. Some near surface serpenti and sandstone rock has been noted.

Northwest portion of site consists of fill overlying 30 feet of Bay Mud. The Bay Mud is underlain by firm sands and clays to bedrock which reaches a maximum depth of about 80 feet at the site's north end.

REMARKS:

FOUNDATION SUPPORT: Northwest Portion: Mat foundation may be possible if excavation level penetrates nearly all of the Bay Mud and the mat would be supported by firm sands and clays. Southeast Portion: Mat foundation likely in firm sands and clays or bedrock.

DEWATERING: Very limited data; however drawdown in neighborhood of 30 feet should be anticipated. Dewatering quantities could be quite large due to proximity of S.F. Bay and the granular (permeable) nature of the deposits.

SHORING: Conventional methods would be appropriate.

EXCAVATABILITY: Conventional excavating could be done, except possibly at southeast portion where bedrock may be encountered above excavation level.

OVERALL RATING: 3

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 11

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Loose Sand and Debris Fill	15
Medium Dense Sands	5-20
Soft Bay Mud (an average of 50 feet deep near east corner of site to no Bay Mud at west corner)	0-75
Firm Clays and Dense Sands	over 100

Ground water level approximately 13 feet deep at center of site

NOTE: Site appears to be located in Bay Mud trough. Soil conditions vary greatly over entire site.

REMARKS:

FOUNDATION SUPPORT: Deep foundation (probably driven piles) support derived from firm soils below Bay Mud.

DEWATERING: Prolonged dewatering may cause some settlement of nearby structures.

SHORING: Adverse soil conditions for a deep excavation. Lateral resistance will have to be derived from soft soils below excavation.

EXCAVATABILITY: Conventional excavation methods may be used. Most of the material above the Bay Mud may be reused; Bay Mud unsuitable for use as fill.

OVERALL RATING: 2

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 12

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sandy Fill	1-15
Loose Sand	3-7
Soft Bay Mud (present only near most westerly corner)	0-6
Dense Sands and Stiff Clays (these layers should be encountered at bottom of excavation)	20±-60±

Ground water encountered 8 feet deep on site.

REMARKS:

FOUNDATION SUPPORT: Mat foundation (or possibly spread footings) placed directly on dense sands at the excavation bottom.

DEWATERING: Large ground water flows should be anticipated through clean sands.

SHORING: Conventional shoring method could be used.

EXCAVATABILITY: Conventional methods could be used. Excavated soils other than Bay Mud could be reused as fill.

OVERALL RATING: 4

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 13

ANTICIPATED SOIL CONDITIONS:

Conditions vary significantly over site. Deep Bay Mud to the east, bedrock on west.

Soil Type	Thickness (feet)
Sandy Fill	10-20
Soft Bay Mud	0-35

Weathered shale and sandstone bedrock observed 10 to 55 feet below ground surface.

REMARKS:

FOUNDATION SUPPORT: End bearing pile support along eastern area of site may be necessary. Depending on location within site, could be mat or spread footings founded on exposed bedrock.

DEWATERING: Long-term dewatering may be difficult due to proximity of structures and Embarcadero waterfront. Large flow quantities are anticipated through the sand fill.

SHORING: Conventional methods would be appropriate.

EXCAVATABILITY: Conventional excavating methods can likely be used. Some blasting may be necessary. Other material can be excavated by conventional methods. Bay Mud not suitable for reuse as fill; other material will likely be suitable.

OVERALL RATING: 2

GEOTECHNICAL SITE EVALUATION
S.F. STADIUM COMPLEX

SITE NO. 14

ANTICIPATED SOIL CONDITIONS:

Soil Type	Thickness (feet)
Sandy and Clayey Fill	20-30 (thinner near Townsend and 3rd)
Bay Mud	20± (0 near Townsend and 3rd)
Firm Sands and Clays	0 near 3rd and Townsend to 70 feet at Berry Street

Bedrock near the ground surface at 3rd and Townsend, increasing to more than 120 feet deep at the Embarcadero.

Water levels 10 feet or less in depth.

REMARKS:

FOUNDATION SUPPORT: Mat foundation possible since firm sands and clays exist at about 40 feet deep. High hydrostatic uplift pressures may require hold downs or subdrain system.

DEWATERING: Large ground water flows should be anticipated due to proximity to S.F. Bay and seawall. Excavation dewatering difficult and expensive. Need to drawdown water table about 35 feet.

SHORING: Shoring could be a major construction cost. Slurry wall (internally braced) may be feasible to provide relatively watertight system. Other systems may be appropriate depending on dewatering approach.

EXCAVATABILITY: Conventional methods are appropriate. Bay Mud not reusable; fill may be reused.

OVERALL RATING: 3

APPENDIX E

Matrix Evaluation

SITENTRI

. ALTERNATIVE SITE SEARCH - PHASE 1

4. MATRIX EVALUATION (APRIL, 1983)

NO WEIGHTING

SITES	NAME	AREA	ESTIMATED TOTAL COST	COST PER SQ FT	FACTOR 1 COST	FACTOR 2 ACCESS	FACTOR 3 PUBLIC	FACTOR 4 SOILS	FACTOR 5 SIZE	FACTOR 6 TIME	FACTOR 7 POLICY	TOTAL NOT WEIGHTED	TOTAL WEIGHTED
1	FALSTAFF	14.60	23.70	37.27	5	1	1	1	2	2	1	13	13
2	SEALS STADIUM	15.17	31.70	47.97	4	1	2	4	4	3	2	20	20
3	FRANKLIN SQUARE	15.11	43.20	65.63	4	1	1	4	4	2	1	17	17
4	SHOWPLACE	17.92	27.50	35.23	4	2	2	3	4	3	1	19	19
5	MISSION BAY 1	14.44	90.00	143.08	1	2.5	4.5	2	3	2	4	19	19
6	MISSION BAY 2	17.19	33.00	44.07	4	3	3.5	1	5	3	3	22.5	22.5
7	CHINA BASIN	13.78	37.87	63.09	4	3.5	3.5	3	2	3	2	21	21
8	MISSION ROCK 1	14.51	14.60	23.10	5	2	4	1	5	4	1	22	22
9	MISSION ROCK 2	21.52	27.50	29.34	4	1	3	1	5	1	1	16	16
10	MISSION BAY 3	17.77	19.30	24.93	5	1	2	3	3	3	1	18	18
11	7TH/HOWARD	47.03	200.00	97.63	0	5	0	2	5	0	0	12	12
12	3RD/4TH	10.34	37.40	83.04	4	4	1	4	0	2	1	16	16
13	RINCON HILL	21.90	100.50	105.35	0	5	4	2	5	2	3	21	21
14	MISSION BAY 4	14.62	38.50	60.45	4	4	4	3	2	4	3	24	24
	SCALE				0 - 6	0 - 5	0 - 5	1 - 4	0 - 5	0 - 5	0 - 5		
	WEIGHT				1.00	1.00	1.00	1.00	1.00	1.00	1.00		

CONCLUSIONS:

A. RANKING OF TOP FIVE SITES WITH SCORES.

1. SITE 14 24.00
2. SITE 6 22.50
3. SITE 8 22.00
4. SITES 7 & 13 21.00
5. SITE 2 20.00

TENTRI

ALTERNATIVE SITE SEARCH - PHASE 1

4. MATRIX EVALUATION (APRIL, 1983)

COST WEIGHTED

TES	NAME	AREA	ESTIMATED TOTAL COST	COST PER SQ FT	FACTOR 1 COST	FACTOR 2 ACCESS	FACTOR 3 PUBLIC	FACTOR 4 SOILS	FACTOR 5 SIZE	FACTOR 6 TIME	FACTOR 7 POLICY	TOTAL NOT WEIGHTED	TOTAL WEIGHTED
1	FALSTAFF	14.60	23.70	37.27	5	1	1	1	2	2	1	13	18
2	SEALS STADIUM	15.17	31.70	47.97	4	1	2	4	4	3	2	20	24
3	FRANKLIN SQUARE	15.11	43.20	65.63	4	1	1	4	4	2	1	17	21
4	SHOWPLACE	17.92	27.50	35.23	4	2	2	3	4	3	1	19	23
5	MISSION BAY 1	14.44	90.00	143.08	1	2.5	4.5	2	3	2	4	19	20
6	MISSION BAY 2	17.19	33.00	44.07	4	3	3.5	1	5	3	3	22.5	26.5
7	CHINA BASIN	13.78	37.87	63.09	4	3.5	3.5	3	2	3	2	21	25
8	MISSION ROCK 1	14.51	14.60	23.10	5	2	4	1	5	4	1	22	27
9	MISSION ROCK 2	21.52	27.50	29.34	4	1	3	1	5	1	1	16	20
0	MISSION BAY 3	17.77	19.30	24.93	5	1	2	3	3	3	1	18	23
1	7TH/HOWARD	47.03	200.00	97.63	0	5	0	2	5	0	0	12	12
2	3RD/4TH	10.34	37.40	83.04	4	4	1	4	0	2	1	16	20
3	RINCON HILL	21.90	100.50	105.35	0	5	4	2	5	2	3	21	21
4	MISSION BAY 4	14.62	38.50	60.45	4	4	4	3	2	4	3	24	28
	SCALE				0 - 6	0 - 5	0 - 5	1 - 4	0 - 5	0 - 5	0 - 5		
	WEIGHT				2.00	1.00	1.00	1.00	1.00	1.00	1.00		

NCLUSIONS:

RANKING OF TOP FIVE SITES WITH SCORES.

1. SITE 14 28.00
2. SITE 8 27.00
3. SITE 6 26.50
4. SITE 7 25.00
5. SITE 2 24.00

SITENTRI

.. ALTERNATIVE SITE SEARCH - PHASE 1

4. MATRIX EVALUATION (APRIL, 1983)

COST/TIME WEIGHTED

SITES	NAME	AREA	ESTIMATED TOTAL COST	COST PER SQ FT	FACTOR 1 COST	FACTOR 2 ACCESS	FACTOR 3 PUBLIC	FACTOR 4 SOILS	FACTOR 5 SIZE	FACTOR 6 TIME	FACTOR 7 POLICY	TOTAL NOT WEIGHTED	TOTAL WEIGHTED
1	FALSTAFF	14.60	23.70	37.27	5	1	1	1	2	2	1	13	20
2	SEALS STADIUM	15.17	31.70	47.97	4	1	2	4	4	3	2	20	27
3	FRANKLIN SQUARE	15.11	43.20	65.63	4	1	1	4	4	2	1	17	23
4	SHOWPLACE	17.92	27.50	35.23	4	2	2	3	4	3	1	19	26
5	MISSION BAY 1	14.44	90.00	143.08	1	2.5	4.5	2	3	2	4	19	22
6	MISSION BAY 2	17.19	33.00	44.07	4	3	3.5	1	5	3	3	22.5	29.5
7	CHINA BASIN	13.78	37.87	63.09	4	3.5	3.5	3	2	3	2	21	28
8	MISSION ROCK 1	14.51	14.60	23.10	5	2	4	1	5	4	1	22	31
9	MISSION ROCK 2	21.52	27.50	29.34	4	1	3	1	5	1	1	16	21
10	MISSION BAY 3	17.77	19.30	24.93	5	1	2	3	3	3	1	18	26
11	7TH/HOWARD	47.03	200.00	97.63	0	5	0	2	5	0	0	12	12
12	3RD/4TH	10.34	37.40	83.04	4	4	1	4	0	2	1	16	22
13	RINCON HILL	21.90	100.50	105.35	0	5	4	2	5	2	3	21	23
14	MISSION BAY 4	14.62	38.50	60.45	4	4	4	3	2	4	3	24	32
	SCALE				0 - 6	0 - 5	0 - 5	1 - 4	0 - 5	0 - 5	0 - 5		
	WEIGHT				2.00	1.00	1.00	1.00	1.00	2.00	1.00		

CONCLUSIONS:

A. RANKING OF TOP FIVE SITES WITH SCORES.

1. SITE 14 32.00
2. SITE 8 31.00
3. SITE 6 29.50
4. SITE 7 28.00
5. SITE 2 27.00

ITENTRI
. ALTERNATIVE SITE SEARCH - PHASE 1
4. MATRII EVALUATION (APRIL, 1983)
PUBLIC WEIGHTED

ITES	NAME	AREA	ESTIMATED TOTAL COST	COST PER SQ FT	FACTOR 1 COST	FACTOR 2 ACCESS	FACTOR 3 PUBLIC	FACTOR 4 SOILS	FACTOR 5 SIZE	FACTOR 6 TIME	FACTOR 7 POLICY	TOTAL NOT WEIGHTED	TOTAL WEIGHTED
1	FALSTAFF	14.60	23.70	37.27	5	1	1	1	2	2	1	13	14
2	SEALS STADIUM	15.17	31.70	47.97	4	1	2	4	4	3	2	20	22
3	FRANKLIN SQUARE	15.11	43.20	65.63	4	1	1	4	4	2	1	17	18
4	SHOWPLACE	17.92	27.50	35.23	4	2	2	3	4	3	1	19	21
5	MISSION BAY 1	14.44	90.00	143.08	1	2.5	4.5	2	3	2	4	19	23.5
6	MISSION BAY 2	17.19	33.00	44.07	4	3	3.5	1	5	3	3	22.5	26
7	CHINA BASIN	13.78	37.87	63.09	4	3.5	3.5	3	2	3	2	21	24.5
8	MISSION ROCK 1	14.51	14.60	23.10	5	2	4	1	5	4	1	22	26
9	MISSION ROCK 2	21.52	27.50	29.34	4	1	3	1	5	1	1	16	19
10	MISSION BAY 3	17.77	19.30	24.93	5	1	2	3	3	3	1	18	20
11	7TH/HOWARD	47.03	200.00	97.63	0	5	0	2	5	0	0	12	12
12	3RD/4TH	10.34	37.40	83.04	4	4	1	4	0	2	1	16	17
13	RINCON HILL	21.90	100.50	105.35	0	5	4	2	5	2	3	21	25
14	MISSION BAY 4	14.62	38.50	60.45	4	4	4	3	2	4	3	24	28
	SCALE				0 - 6	0 - 5	0 - 5	1 - 4	0 - 5	0 - 5	0 - 5		
	WEIGHT				1.00	1.00	2.00	1.00	1.00	1.00	1.00		

NCLUSIONS:

RANKING OF TOP FIVE SITES WITH SCORES.

1. SITE 14 28.00
2. SITES 6 & 8 26.00
3. SITE 13 25.00
4. SITE 7 24.50
5. SITE 5 23.50

SITEMTRX

.. ALTERNATIVE SITE SEARCH - PHASE 1

4. MATRIX EVALUATION (APRIL, 1983)

PUBLIC/POLICY WEIGHTED

SITES	NAME	AREA	ESTIMATED TOTAL COST	COST PER SQ FT	FACTOR 1 COST	FACTOR 2 ACCESS	FACTOR 3 PUBLIC	FACTOR 4 SOILS	FACTOR 5 SIZE	FACTOR 6 TIME	FACTOR 7 POLICY	TOTAL NOT WEIGHTED	TOTAL WEIGHTED
1	FALSTAFF	14.60	23.70	37.27	5	1	1	1	2	2	1	13	15
2	SEALS STADIUM	15.17	31.70	47.97	4	1	2	4	4	3	2	20	24
3	FRANKLIN SQUARE	15.11	43.20	65.63	4	1	1	4	4	2	1	17	19
4	SHOWPLACE	17.92	27.50	35.23	4	2	2	3	4	3	1	19	22
5	MISSION BAY 1	14.44	90.00	143.08	1	2.5	4.5	2	3	2	4	19	27.5
6	MISSION BAY 2	17.19	33.00	44.07	4	3	3.5	1	5	3	3	22.5	29
7	CHINA BASIN	13.78	37.87	63.09	4	3.5	3.5	3	2	3	2	21	26.5
8	MISSION ROCK 1	14.51	14.60	23.10	5	2	4	1	5	4	1	22	27
9	MISSION ROCK 2	21.52	27.50	29.34	4	1	3	1	5	1	1	16	20
10	MISSION BAY 3	17.77	19.30	24.93	5	1	2	3	3	3	1	18	21
11	7TH/HOWARD	47.03	200.00	97.63	0	5	0	2	5	0	0	12	12
12	3RD/4TH	10.34	37.40	83.04	4	4	1	4	0	2	1	16	18
13	RINCON HILL	21.90	100.50	105.35	0	5	4	2	5	2	3	21	28
14	MISSION BAY 4	14.62	38.50	60.45	4	4	4	3	2	4	3	24	31
	SCALE				0 - 6	0 - 5	0 - 5	1 - 4	0 - 5	0 - 5	0 - 5		
	WEIGHT				1.00	1.00	2.00	1.00	1.00	1.00	2.00		

CONCLUSIONS:

A. RANKINGS OF TOP FIVE SITES WITH SCORES.

1. SITE 14 31.00
2. SITE 6 29.00
3. SITE 13 28.00
4. SITE 5 27.50
5. SITE 8 27.00

ITEMTRI

A. ALTERNATIVE SITE SEARCH - PHASE 1

4. MATRIX EVALUATION (APRIL, 1983)

ACCESS WEIGHTED

SITES	NAME	AREA	ESTIMATED TOTAL COST	COST PER SQ FT	FACTOR 1 COST	FACTOR 2 ACCESS	FACTOR 3 PUBLIC	FACTOR 4 SOILS	FACTOR 5 SIZE	FACTOR 6 TIME	FACTOR 7 POLICY	TOTAL NOT WEIGHTED	TOTAL WEIGHTED
1	FALSTAFF	14.60	23.70	37.27	5	1	1	1	2	2	1	13	14
2	SEALS STADIUM	15.17	31.70	47.97	4	1	2	4	4	3	2	20	21
3	FRANKLIN SQUARE	15.11	43.20	65.63	4	1	1	4	4	2	1	17	18
4	SHOWPLACE	17.92	27.50	35.23	4	2	2	3	4	3	1	19	21
5	MISSION BAY 1	14.44	90.00	143.08	1	2.5	4.5	2	3	2	4	19	21.5
6	MISSION BAY 2	17.19	33.00	44.07	4	3	3.5	1	5	3	3	22.5	25.5
7	CHINA BASIN	13.78	37.87	63.09	4	3.5	3.5	3	2	3	2	21	24.5
8	MISSION ROCK 1	14.51	14.60	23.10	5	2	4	1	5	4	1	22	24
9	MISSION ROCK 2	21.52	27.50	29.34	4	1	3	1	5	1	1	16	17
10	MISSION BAY 3	17.77	19.30	24.93	5	1	2	3	3	3	1	18	19
11	7TH/HOWARD	47.03	200.00	97.63	0	5	0	2	5	0	0	12	17
12	3RD/4TH	10.34	37.40	83.04	4	4	1	4	0	2	1	16	20
13	RINCON HILL	21.90	100.50	105.35	0	5	4	2	5	2	3	21	26
14	MISSION BAY 4	14.62	38.50	60.45	4	4	4	3	2	4	3	24	28
	SCALE				0 - 6	0 - 5	0 - 5	1 - 4	0 - 5	0 - 5	0 - 5		
	WEIGHT				1.00	2.00	1.00	1.00	1.00	1.00	1.00		

CONCLUSIONS:

A. RANKING OF TOP FIVE SITES WITH SCORES.

1. SITE 14 28.00
2. SITE 13 26.00
3. SITE 6 25.50
4. SITE 7 24.50
5. SITE 8 24.00

2. DESIGN and ENGINEERING

A. SCOPE

The task force has been charged with the responsibility of investigating the impacts of a new stadium in the downtown area. The data contained in this section of the report attempts to pinpoint the major impacts of urban design, architecture and engineering. Its goal is to answer the questions of what can be logically done with a typical south-of-Market site to provide a complete, up-to-date, multi-use stadium facility.

In order to satisfy this goal, a program was developed, alternate stadia shapes were investigated and evaluated, alternate structural systems were studied, and a logical form was selected to be represented. Please note: the selection of this shape and structural system does not represent a recommendation; it is a demonstration of what the study team feels to be a logical shape, mass, structural system and an architectural expression that would be appropriate to the site study area.

The circular shape, or its derivatives, such as the octorad, was selected because it responds to most of the site constraints and works best to convert from baseball to football. It is also a good shape to accomodate all of the other uses that this stadium will be used for, i.e., basketball, soccer, hockey, circus, rodeo, conventions, concerts, etc.

The circle also accomodates the structural system selected by the study team for "in-depth" investigation. The fixed cable truss system that would support tensioned fabric is referred to as a tensegrity dome. A major factor in the selection of this system for demonstration purposes is its ability to provide an operable section to open up to the sky. A 300 foot diameter section in the center of the dome can be opened up by gathering the fabric on cables and pulleys to a central storage gondola.

The appearance of this fascinating architecture will be striking from both interior and exterior views. It will also blend well with the waterfront. This and other urban planning considerations are explored further in this report.

B. DATA

In developing a program and demonstration design for a new downtown stadium, the study team called upon the following resources:

1. The experience of the team itself. The architects, engineers, and the ten consultants on the team have been involved in most of the major athletic facilities developed in this country in the past 15 years. This experience allowed them to call upon a vast store of firsthand knowledge in the investigation of alternatives and establishment of reasonable parameters for a new facility.

2. Data collected regarding the major league stadia designed by study team members and others throughout the USA (see chart entitled "Stadium Comparisons").

3. Data and information gathered from City and State departments and agencies.

4. Meetings and investigations of the City and National agencies responsible for the administration of building codes, i.e., City Building and Fire Departments, I.C.B.O., etc.

5. Meetings with and the sharing of planning data with the planners of the China Basin Project (S.P. Land Company) and the China Basin Building. (See section entitled "Public Opinion" for the input from other planners, neighborhood groups and developers of adjacent projects.)

6. Data gathered by the Planning Department of the City of San Francisco.

7. Data gathered from the major league teams, the 49'ers and the Giants.

COMP1

STADIUM COMPARISONS

STADIUM NAME	LOCATION	SITE	YEAR OPENED	BASEBALL TEAM	BASEBALL CAPACITY	FOOTBALL TEAM	FOOTBALL CAPACITY	TYPE	AUTO PARKING	BUS PARKING	COST	BOXES
CANDLESTICK	SAN FRANCISCO	SUBURBAN	1960/71	GIANTS	59165	49ERS	62100	OPEN	7213	260		
ANAHEIM	ANAHEIM	SUBURBAN	1966	ANGELS	43200	RAMS	-----	OPEN	12000	---	$ 17.1	107
ARLINGTON	ARLINGTON	SUBURBAN	----	RANGERS	35700	---------	-----	----	-----	---	-----	---
ARROWHEAD	KANSAS CITY	SUBURBAN	1972	---------	-----	CHIEFS	78000	OPEN	18000	200	$ 30.3	83
ASTRODOME	HOUSTON	SUBURBAN	1964	ASTROS	46200	OILERS	50500	DOMED	30000	---	$ 31.0	---
ATLANTA	ATLANTA	DOWNTOWN	----	BRAVES	52900	FALCONS	60700	----	-----	---	-----	---
B.C. PLACE	VANCOUVER	DOWNTOWN	----	---------	-----	---------	60000	----	-----	---	$ 90.0	120
BUSCH	ST LOUIS	DOWNTOWN	1966	CARDINALS	51100	CARDINALS	51400	OPEN	7400	---	$ 22.5	---
CARRIER DOME	SYRACUSE	SUBURBAN	1980	---------	-----	---------	50000	DOMED	-----	---	$ 27.0	36
DODGER	LOS ANGELES	---------	----	DODGERS	56000	---------	-----	----	-----	---	-----	---
FENWAY PARK	BOSTON	DOWNTOWN	1912	RED SOX	33400	---------	-----	OPEN	-----	---	-----	---
GIANT	NEW YORK	SUBURBAN	1976	---------	-----	GIANTS	76900	OPEN	12000	400	$ 73.0	66
H.H. HUMPHREY	MINNEAPOLIS	DOWNTOWN	1982	TWINS	35000	VIKINGS	60000	DOMED	-----	---	$ 42.0	112
HOOSIERDOME	INDIANAPOLIS	DOWNTOWN	1983	---------	-----	---------	63000	DOMED	-----	---	$ 75.0	104
KINGDOME	SEATTLE	DOWNTOWN	1975	MARINERS	59500	SEAHAWKS	64900	DOMED	2000	---	$ 67.0	0
LAMBEAU	GREEN BAY	---------	----	---------	-----	PACKERS	56200	----	-----	---	-----	---
MEADOWLANDS	NEW YORK	SUBURBAN	1976	---------	-----	GIANTS	76800	OPEN	20000	400	-----	66
MEMORIAL	BALTIMORE	DOWNTOWN	----	ORIOLES	52100	COLTS	60700	----	-----	---	-----	---
MILE HIGH	DENVER	DOWNTOWN	1977	---------	-----	BRONCOS	75000	OPEN	-----	---	-----	50
MILWAUKEE	MILWAUKEE	---------	----	BREWERS	47500	PACKERS	56000	----	-----	---	-----	---
MUNICIPAL	CLEVELAND	DOWNTOWN	----	INDIANS	77000	BROWNS	80300	OPEN	-----	---	-----	108
OAKLAND	OAKLAND	SUBURBAN	----	A'S	50000	---------	54600	----	-----	---	-----	---
ORANGE BOWL	MIAMI	DOWNTOWN	----	---------	-----	DOLPHINS	75500	----	-----	---	-----	---
RFK	WASHINGTON	SUBURBAN	1962	---------	43500	REDSKINS	55000	OPEN	12500	---	$ 19.8	---
RICH	BUFFALO	SUBURBAN	1973	---------	-----	BILLS	90000	OPEN	16000	300	$ 21.6	34
RIVERFRONT	CINCINNATI	DOWNTOWN	1970	REDS	51000	BENGALS	59700	OPEN	3000	---	$ 28.0	---
ROYALS	KANSAS CITY	SUBURBAN	1973	ROYALS	40800	---------	-----	OPEN	18000	200	$ 21.0	30
SAN DIEGO	SAN DIEGO	SUBURBAN	1968	PADRES	48000	CHARGERS	52700	OPEN	15000	---	$ 20.4	29
SCHAEFER	FOXBORO	SUBURBAN	----	---------	-----	PATRIOTS	61300	----	-----	---	$ 7.0	42
SHEA	NEW YORK	SUBURBAN	----	METS	55300	JETS	60400	----	-----	---	-----	---
SILVERDOME	PONTIAC	SUBURBAN	1975	---------	-----	LIONS	80650	DOMED	10000	400	$ 46.1	102
SOLDIER FIELD	CHICAGO	DOWNTOWN	1976	---------	-----	BEARS	64500	OPEN	-----	---	-----	116
SOX PARK	CHICAGO	DOWNTOWN	----	WHITESOX	44500	---------	-----	----	-----	---	-----	27
SUPERDOME	NEW ORLEANS	DOWNTOWN	1974	---------	65000	SAINTS	71300	DOMED	5000	---	$169.7	64
TAMPA	TAMPA	SUBURBAN	----	---------	-----	BUCS	72100	OPEN	-----	---	-----	24
TEXAS	IRVINE	SUBURBAN	1971	---------	-----	COWBOYS	65000	OPEN	15000	500	$ 21.0	192
THREE RIVERS	PITTSBURGH	DOWNTOWN	1970	PIRATES	50200	STEELERS	54000	OPEN	4500	---	$ 41.0	---
TIGER	DETROIT	---------	----	TIGERS	54220	---------	-----	----	-----	---	-----	---
VETERANS	PHILADELPHIA	DOWNTOWN	1971	PHILLIES	56300	EAGLES	65000	OPEN	12000	---	$ 50.0	23
WRIGLEY FIELD	CHICAGO	DOWNTOWN	----	CUBS	37700	---------	-----	OPEN	-----	---	-----	---
YANKEE	NEW YORK	---------	----	YANKEES	55300	---------	-----	----	-----	---	-----	---

GEOTECHNICAL

A. SCOPE

A knowledge of the soil and ground water conditions in the Study Area is essential if foundation costs are to be accurately estimated. The geotechnical engineering effort was directed at acquiring and reviewing existing subsurface data and to present this data in a form useful in preliminary planning and costing. Existing information was utilized to its fullest. Where adequate data was lacking, test borings were drilled, as time and budget permitted. The purpose of the geotechnical engineering effort was to evaluate primary soil and foundation engineering considerations in the Study Area. These consisted of:

1. Soil and ground water conditions
2. Seismic considerations
3. Probable foundation type(s)
4. Ground water control
5. Playing field and interior floor slab support
6. Excavation characteristics of subsurface materials
7. Excavation shoring and underpinning

B. DATA

Basically, three sources of data were used to evaluate subsurface conditions within the study area. These were (1) internal information from the study team members, (2) publically available information, and 3) test borings drilled as part of this study. As shown on the Site Plan, Plate 1, about 100 test borings have been drilled in or around the study area. Most of these borings are in the corridor bounded by King and Channel Streets. Many of the borings were drilled by HLA and GRC. The other boring logs were from three sources: Caltrans for the Southern Embarcadero Freeway Study; the City of San Francisco for the Channel Outfall Project; and various borings drilled for the San Francisco Port Authority.

Three test borings were drilled for this study where little reliable data were available. The location of these borings are shown on Plate 1. They ranged from 45 to 70 feet deep and were drilled using rotary wash drilling equipment.

C. ALTERNATIVES

(Not applicable for the geotechnical engineering section)

D. ANALYSIS

1. Introduction

Geotechnical considerations will have a major impact on the siting and cost of a new stadium due to the predominately poor soil conditions within the Study Area. Future settlement, seismic hazards and the need for deep foundation support (piles) was evaluated for each site. With proper design, a new stadium can be developed within the Study Area; similar geotechnical conditions have been encountered by existing major developments in San Francisco.

The Study Area encompasses a corridor about 800 feet wide and 4000 feet long. Within this area, the study team has selected three sites that will be specifically evaluated. These have been designated Sites 5 and 7, which represent the most westerly and easterly portions of the Study Area. Site 14 which is adjacent to Site 7 and extends to Fourth Street. The subsurface conditions underlying these three sites are discussed in detail. Conditions in the remaining area bounded by Fourth and Sixth Streets are significantly different and could impact the design and cost of a stadium. The general soil conditions in this area are illustrated on the following plates. However, their engineering impact has not been specifically addressed since it was outside the scope of this study.

A recently completed 17± foot-diameter waste water sewer runs beneath the study area. Its alignment follows Berry Street between 7th and 4th Streets, along 4th Street to King, and beneath King Street between 4th and The Embarcadero. Although not discussed herein, the existence and/or possible alignment of this sewer must be considered.

2. Site Conditions

a. General Setting

The Study Area generally falls in an area formerly occupied by the San Francisco Bay and adjoining marshlands. Plate 2 illustrates the approximate locations of the 1852 boundary of the former shoreline. The soil conditions outboard (easterly) of the former shoreline essentially consisted of soft marsh and bay deposits.

Reclamation of the Mission Bay area was accomplished by filling over the marsh and bay deposits. The shoreline as we know it today was formed in the early 1900's.

Shown on Plate 1 are the locations of the existing China Basin seawall and former wharves. The seawall was completed in the early 1900's and is composed of large rock fragments. It is likely that the wharves were not removed as the area was filled, but rather buried in-place. Generally, the wharf decks were in extremely poor, rotted condition. In many cases they were destroyed during filling. However, the supporting piles generally have remained in sound condition beneath the mudline.

b. Soil and Ground Water Conditions

Using data provided by test boring logs, generalized subsurface profiles were prepared along and perpendicular to Berry Street. The cross-sections are presented on Plates 3 and 4; for general discussion purposes, the section along Berry Street adequately illustrates the subsurface conditions characteristic of the Study Area.

As indicated on the profiles, the soil conditions across the site can be characterized by fill overlying soft silts and clays, commonly known as Bay Mud. Beneath the Bay Mud are sands and clays of the Posey and San Antonio Formations. These soils are underlain by Franciscan Formation bedrock. The Bay Mud is relatively shallow between Third and Fourth Streets (Site 14) but exists as an ancient mud-filled valley up to 120 feet deep between Fourth and Sixth Streets. In Sites 5 and 7, to the east and west, Bay Mud depths are moderate, extending to depths of 40 to 50 feet below the existing ground surface.

For purposes of discussion, we have delineated four distinct soil and rock strata. The general characteristics of these strata, which are shown on the profiles, are summarized below:

Fill: The fill varies widely in both its content and density. It consists primarily of loose to medium dense sand or silty sand, but also contains construction debris, brick rubble, and refuse. In some areas behind the China Basin seawall, bay mud, dredged from the bottom of the bay, was also used as fill.

Bay Mud: The Bay Mud is a highly compressible organic silt or clay which is typically soft near the upper boundary of the layer and medium stiff at lower elevations. It is a geologically recent deposit containing shells, organic matter and discontinuous lenses of sand. In many areas the mud

is still consolidating (i.e, compressing) under the weight of the overlying fill.

Sands and Clays: The soils which generally underlie the Bay Mud consist of interbedded layers of sands and clays. The sands are fine grained, medium dense to very dense and contain varying amounts of silt and clay. They have moderate to high strength and low compressibility. The clays have moderate strengths, low to moderate compressibilities and have been consolidated under a higher pressure than exists today. In many cases, distinct layers of Old Bay Clay (an older marine deposit) were encountered. Irregular lenses of sand exist within these clay layers.

Bedrock: Bedrock consists of highly sheared and deeply weathered shales, serpentinite, chert and sandstone of the Franciscan formation.

Ground water within the Study Area varies from about Elevation -5 to -10 feet (San Francisco Datum). This corresponds to depths of about 5 to 10 feet below existing grades. The ground water levels are shown on the profiles next to test boring locations where measurements were recorded. The water table is expected to fluctuate somewhat seasonally and also with tidal fluctuations near the bay and/or channel.

c. Seismicity

The Study Area is located in the seismically active San Francisco Bay Region. Faults near San Francisco are known to be active and earthquakes producing strong ground shaking at the Study Area should be expected in the future. No active or potentially active faults are known to exist within the Study Area.

Past earthquakes that occurred in the San Francisco Bay region were associated with crustal movements generated along well-defined fault zones. The San Andreas Fault, located about 10 miles west of the Study Area, is capable of producing the largest earthquake. Historically, the largest known earthquakes along the San Andreas fault occurred in 1838, 1865, and 1906. The magnitude of the 1906 earthquake was estimated to be 8.3 on the Richter scale. During the earthquake, ground shaking within the Study Area was documented. The 1838 and 1865 earthquakes had magnitudes of about 7.0 or greater and also caused severe damage in San Francisco; however, there is relatively little documentation.

Other major active faults which could generate earthquakes affecting the Study Area are the Hayward and Calaveras Faults. The Hayward Fault, about 11 miles east, trends in a northwesterly direction along the base of the

Berkeley Hills. The Calaveras fault passes east of San Jose and trends in a northwesterly direction about 22 miles east of the Study Area. These faults are capable of producing earthquakes with Richter magnitudes on the order of 7.0 to 7.5 which will cause strong ground shaking at the site.

The recurrence interval for an earthquake on the San Andreas Fault with a magnitude of 8.3, would range from 100 to 1000 years. Along the Hayward and Calaveras Faults, a maximum earthquake with a magnitude between 7.0 and 7.5 may recur at 100 year intervals. Earthquakes of smaller magnitudes could occur more frequently on all the major faults.

Two geologic discontinuities, consisting of highly sheared rock zones, have been mapped in San Francisco. They are the City College Shear zone, located about 7 miles west of the Study Area, and the Fort Point-Hunter's Point Shear zone, about 1 mile east of the Study Area. Both of these shear zones are considered to be inactive.

3. Geohazards

a. Seismically Induced

Because of the high potential for seismic activity in the San Francisco area, future development should be designed to limit damage due to seismic hazards. As documented by many observers, the 1906 earthquake caused severe damage to buildings and utilities in the Study Area. The geohazards that could occur at the area during a major earthquake are discussed below.

1) Liquefaction Potential

Most of the Study Area is blanketed by sandy fill that is relatively loose, saturated below the ground water table and therefore judged susceptible to liquefaction*. In the event of a major earthquake, liquefaction in the fill will probably occur. Many of the ground failures that occurred along the waterfront during the 1906 earthquake have been attributed to liquefaction of the fill.

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* Liquefaction occurs in loose, saturated granular soils when water pressures within the soil build up during ground shaking. The pressure transforms the soil from a solid to a semi-liquid state, causing a temporary loss of the soil's strength.

Soil liquefaction can induce many types of ground failures such as lateral spreading and lurching. Footings supported on soil that liquefies could lose support. Based on previous records, it is anticipated that in areas affected by liquefaction, streets could crack and utilities could rupture. Buildings or structures supported on the fill could experience large settlements, lateral displacements or foundation failures. The liquefaction potential of the fill can be reduced by densifying the loose sand fill. The effects of liquefaction can be minimized by supporting structures on foundations which extend through the fill to competent soil and/or rock.

2) Soil Densification

During an earthquake, soil densification can take place above the ground water table in the loose granular fill. Irregular surface settlement could result. This settlement will be relatively small, probably on the order of several inches, because there is typically a limited thickness of fill above the water table. This settlement will likely have little impact on the stadium structure; however, it could cause settlement of slabs and utilities adjacent to the structure. The soil densification/settlement concern can be significantly reduced by densifying the fills using methods such as vibroflotation.

3) Ground Shaking

Severe ground shaking can be expected at the Study Area during major Bay Area earthquakes. The stadium complex should be designed to resist the seismic forces resulting from strong ground motions. Ground motion characteristics at a specific site, including amplitude, frequency and duration of motion, are dependent on the distance to the earthquake fault, earthquake magnitude, the nature of bedrock motion and the soil conditions. Site specific studies are required to evaluate ground motions at the site.

4) Tsunamis and Seiches

Tsunamis are sequences of long period sea waves generated in the ocean by earthquake impulses. Seiches are periodic oscillations of confined bodies of water caused by earthquakes. Even if a large tsunami or seiche occurred, it is unlikely that the Study Area will be inundated. Based on a report by the U.S. Army Corps of Engineers, a probable maximum tsunami wave 8 feet above mean lower low water level (MLLW) could occur every 100 years. A tsunami wave 11 feet above MLLW could occur at 500 year intervals. The highest of these waves

would be slightly lower than zero elevation, San Francisco Datum, the approximate site elevation. Based on past earthquake records, a seiche in the Bay Area will not exceed the probable tsunami run-up.

b. Settlement

When the Mission Bay area was reclaimed from the San Francisco Bay, the Bay Mud beneath the site began to compress under the weight of the fill and the area began to subside. Estimates made by others indicate that about 2 to 10 inches of settlement will occur over the next 50 years. In general, settlement will be proportional to the thickness of the fill and the Bay Mud beneath the site. If new fill is placed, additional settlement will occur and hence, grading should be minimized. Differential settlement will occur between the ground surface and pile or non-fill supported structures. This differential movement will have to be compensated for at entrances to the complex and where fill supported utilities will enter the structure.

4. <u>Foundation Support</u>

The main factors to be considered in selecting a suitable foundation type for the stadium are the structural loads, bottom elevation of the stadium structure and playing field, thickness of the fill and underlying Bay Mud deposits, and depth the structure extends below ground water.

In general, the stadium will be a moderately heavy structure and one that cannot tolerate large differential settlements. As currently planned, the playing field could be situated at about the elevation of the existing ground surface (i.e., no significant excavation) or it could be bottomed as deep as 25 feet below ground.

Foundation support must be obtained below the fill and Bay Mud. These soils will not provide adequate support for the planned heavy structure since they typically have low, variable strengths and the Bay Mud is highly compressible. All foundations should obtain support in the underlying sands and clays (subsequently referred to as supporting soils) and/or bedrock. The approximate elevations of the bottom of Bay Mud deposits (i.e., top of supporting soils) is presented on Plate 5. Where final subgrade elevations for the structure and playing field are within about 10 feet of the supporting soils, it may be economical to remove unsuitable fill and Bay Mud and replace them with properly compacted fill that is capable of supporting foundations. Spread footings or a mat bottomed on the fill or on natural supporting soils could then be used. Where

supporting soils are more than 10 feet below subgrade, pile foundations should be used

Pile foundations will likely consist of precast, prestressed concrete piles. The most appropriate pile type will probably be 12 inches square, designed to support a dead plus live load of 100 tons. This value can be increased by one-third for total loads including seismic. For planning purposes, pile lengths should be selected by assuming they either penetrate 5 feet into bedrock or 40 feet into the supporting soils, whichever length is shorter. Actual pile lengths will likely vary significantly, depending on the specific soil conditions beneath the structure.

Spread footings or a mat foundation could be used if they are bottomed on properly compacted fill, the firm supporting soils or bedrock. Allowable bearing pressures on these materials will vary significantly. For select granular, compacted fill and firm natural soils, bearing pressures will likely vary between 5,000 and 15,000 pounds per square foot (psf) for dead plus live load. For planning purposes, footings should be sized using a bearing pressure of 7500 psf; this value can be increased by 30 percent for seismic loads. Footings on bedrock will likely be designed using bearing pressures of 15,000 to 30,000 psf with a 30 percent increase for seismic loads. For planning purposes, an allowable bearing pressure of 15,000 psf should be used. Where high uplift loads (due to water pressures) are to be resisted, a mat foundation may be appropriate.

Preliminary foundation criteria for Sites 5, 7 and 14 are discussed below:

Site 5: Site 5 is underlain by about 20 feet of sand fill and 20 to 40 feet of Bay Mud. Beneath the Bay Mud are the supporting sands and clays which extend to a depth of about 160 to 180 feet where bedrock was encountered.

Driven pile foundations will be appropriate for this site. For planning purposes, a pile tip elevation of -80 to -100 feet (City of San Francisco Datum) should be assumed.

Site 7: Site 7 is underlain by about 20 feet of sand fill which is underlain by Bay Mud. The top of the supporting soils varies from about Elevation -20 in the west corner of the site to Elevation -50 near the east corner. The bedrock surface elevation varies dramatically from Elevation -45 at King Street to deeper than Elevation -200 near the China Basin Channel.

A driven pile foundation will likely be the most economical system for Site 7. Piles will likely have to be driven at least 40 feet below the elevations shown on Plate 5.

Site 14: Site 14 is underlain by supporting soil and/or bedrock at relatively shallow depths (i.e., less than 20 feet below the ground surface). However, south of Berry Street the Bay Mud layer tends to thicken rapidly. In this southern area, supporting soils exist at depths of 40 to 50 feet.

Shallow foundations appear appropriate for a majority of Site 14. They will bottom in either firm natural soils or bedrock. South of Berry Street, it will likely be necessary to use pile foundations driven to practical refusal in bedrock.

5. Ground Water Control

Where the stadium excavation extends below the ground water level (approximate El.-8 feet), temporary (i.e., during construction) dewatering will be required. On a long-term basis, the structure should be designed to resist uplift forces or fitted with an underdrain system to eliminate uplift pressures.

During construction, the most appropriate type of dewatering system will depend upon the depth of the excavation and the shoring system used. As discussed in subsequent sections, interlocking sheet pile shoring will likely be most appropriate. This type of system is relatively water-tight and, providing it extends into Bay Mud, should provide a relatively water-tight moisture barrier around the perimeter of the excavation. In most situations, this will minimize seepage quantities and allow relatively simple, conventional construction dewatering methods to be utilized.

Seepage quantities should generally be small. In Site 14, where highly fractured rock could be exposed, significant seepage could occur through the bottom of the excavation. The dewatering methods will vary greatly depending primarily upon the depth the excavation extends below the ground water table and the characteristics of rock. Where the excavation exposes rock and extends more than 5 feet below the ground water table, dewatering wells will likely be required.

The playing field for the depressed Scheme would likely be underlain by a drain consisting of a gravel and sand blanket 2 to 4 feet thick. Perforated PVC collector pipes (4-inch-diameter) would be placed within the blanket on 15 to 25-foot centers which drain by gravity to pumped sumps. Pipes should be embedded sufficiently beneath the surface to limit damage

from heavy equipment. The drainage blanket should be placed on a surface covered with a geotextile fabric to limit the migration of soil "fines" and possible clogging of the drain system.

Flow quantities into the permanent subdrain system will vary significantly across the site, being dependent on the type of soil or rock encountered at subgrade level and the excavation depth. Where the playing field is underlain by Bay Mud, seepage quantities will likely be comparatively small. Where the playing field is underlain by rock or sandy soils (Site 14), seepage quantities will be greater. The seepage quantities encountered at Site 14 could be reduced by grouting the materials below the excavation bottom. For preliminary planning purposes, a seepage quantity of 200 gallons per minute should be assumed.

It is important that both construction and permanent dewatering systems be designed so that regional ground water level is not lowered. This can be accomplished by constructing a cutoff around the perimeter of the site. Sheet piles installed for shoring could be used for this purpose. Sheets should be designed as a permanent part of the facility and should be protected from corrosion. Special steel alloy sheets or cathodic corrosion protection may be required to provide reasonable assurance of long life. An alternate shoring and cutoff scheme would be slurry wall.

6. Support of Floor Slabs and the Playing Field Surface

The bottom level floor slab and the playing field surface must be able to support reasonably heavy surface loads that could be imposed by construction and/or maintenance equipment along with loads that may be imposed during special programs (such as heavy equipment displays). Where the floor slab is underlain by supporting soils or bedrock, only minor preparation will be required (other than construction of the underdrain). For the at-grade design, the existing fills are generally capable of supporting floors and a playing field surface provided the upper 2 to 4 feet is cleaned of debris and recompacted. Where continued site settlement is anticipated, floors may have to be pile-supported or designed to accommodate the anticipated future settlement, possibly by allowing them to "float".

Of special concern is where the playing field slabs must be constructed on Bay Mud. Where this condition occurs, the area beneath the stadium should be blanketed with a layer of compacted granular fill. This would entail overexcavating 5 to 8 feet of Bay Mud, placing a geotextile fabric on the bottom of

the excavation and refilling with compacted granular fill. The present on-site sand fill would be suitable for this purpose. The permanent slab underdrain could comprise a portion of this fill blanket. Fill placement and compaction would have to be done carefully to avoid disturbing the mud and creating "mud waves."

An alternative to the overexcavation and replacement scheme would be to use a structurally reinforced slab capable of distributing imposed loads. Depending on the intended use of the facility, the slab may be relatively thick and possibly structurally supported, to account for the poor subgrade conditions.

The following briefly reviews the preparation required for each site.

Site 5: For a stadium depressed 25 feet below the ground surface, the entire structure would bottom in Bay Mud. For this condition, a fill blanket 5 to 8 feet thick covering the entire area would be required.

Site 7: For a 25-foot-deep depressed playing surface, Bay Mud would be exposed over approximately two-thirds of the stadium area. A fill blanket will be required over this area.

Site 14: In general, competent soils and/or rock will be exposed in a 25-foot-deep excavation at Site 14, which will provide stable subgrade conditions. Relatively minor earthwork will be required to remove thin layers of Bay Mud.

7. Excavation Characteristics of Subsurface Materials

In general, all of the materials that will be encountered in the Study Area can be excavated with equipment that is conventionally used in the Bay Area. The excavation costs for each material are distinguished by (1) the nearness of a disposal area, (2) their ability to support construction equipment, and (3) the most efficient type of excavation equipment.

Pertinent characteristics of each strata are discussed below:

Fill: The sand fill can be excavated with conventional earth-moving equipment such as loaders and dozers. The fill is capable of supporting relatively heavy loads without difficulty except where Bay Mud soils are within 3 feet or so of the applied load. The sand is reusable and frequently saleable.

Bay Mud: The Bay Mud is weak and will not support heavy construction equipment. It is frequently excavated with drag lines or clam-shell excavators. Large excavations may require the construction of "trestles" or comparable structures that will facilitate access for excavators. The Bay Mud is seldom reusable and disposal costs are comparatively high.

Sands and Clays: In general, the sands and clays can support construction equipment. The material is judged to be a moderate quality fill and is probably reusable and/or saleable. However, some of the saturated clayey soils may have to be wasted. The soils can be excavated with conventional earth moving equipment.

Bedrock: The bedrock consists of the Franciscan Formation and is generally very fractured and sheared. The rock can generally be excavated with conventional bulldozers with single or multiple rippers. Occasional hard inclusions may require blasting but this is not expected to be extensive. The excavated material is reusable as fill or is saleable; disposal sites are generally available.

8. Shoring and Underpinning

A retained excavation should be considered where the playing field and structure will be below grade. Where the excavation extends below the ground water level (about 8 feet), shoring should consist of interlocking steel sheet piles to control ground water inflow into the excavation. In general, the sheet piles should extend at least 5 feet into firm soil or 60 to 80 feet below the ground surface where deep Bay Mud deposits are encountered. Internal bracing will be required. Grouted tiebacks may be appropriate to restrain the upper portions of the system where sandy fill soils will be encountered. Where the excavation penetrates bedrock, such as at Site 14, a different type of shoring system will likely be required to retain that portion of the excavation in rock since the sheet piles will be unable to penetrate these materials. Options for the lower system in rock may include (1) utilizing a sloping rock cut instead of shoring, (2) soldier piles (set and cast in drilled holes) which are laterally restrained by grouted tiebacks, or (3) a reinforced shotcrete facing laterally restrained by grouted tiebacks. It is likely that an excavation larger than that required for the structure will be needed to account for the shoring offset in rock.

In general, the stadium will not abut any existing structures. Thus, extensive underpinning of adjacent structures is not anticipated. The shoring system should be designed to prevent large lateral movements of the sheet piles which would

result in settlement of the surrounding ground surface. Excessive settlement could disrupt utility services and cause cracking and deterioration of sidewalks and roads.

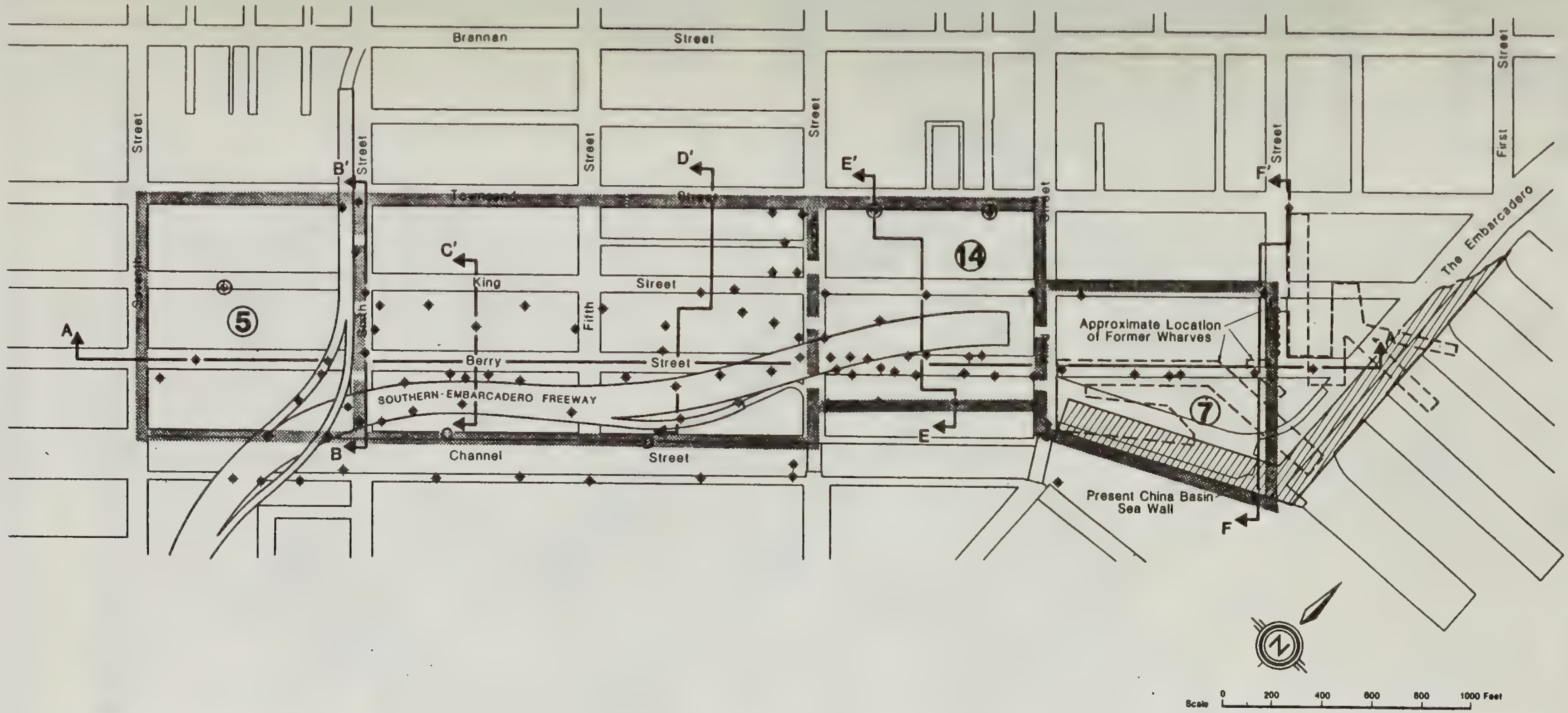
Where deep excavations must be made into Bay Mud, excavation and bracing installation must be carefully coordinated. Sheet pile systems will deflect into the excavation because of the low strength of the Bay Mud. The longer the excavation is left unbraced, the larger the lateral movements can be. It no doubt will be advantageous to excavate the site in carefully planned stages to minimize the time the system remains unbraced. Lateral movements of several inches are not uncommon.

The following briefly summarizes the shoring considerations for each site.

Site 5: Sheet piles should be driven into the supporting soils observed at depths between 50 and 80 feet below the ground surface.

Site 7: Sheet piles should be driven into supporting sands and clays which exist at 20 to 60 feet below the ground surface. Near China Basin, sheet piles may encounter old piles and possibly portions of the present seawall.

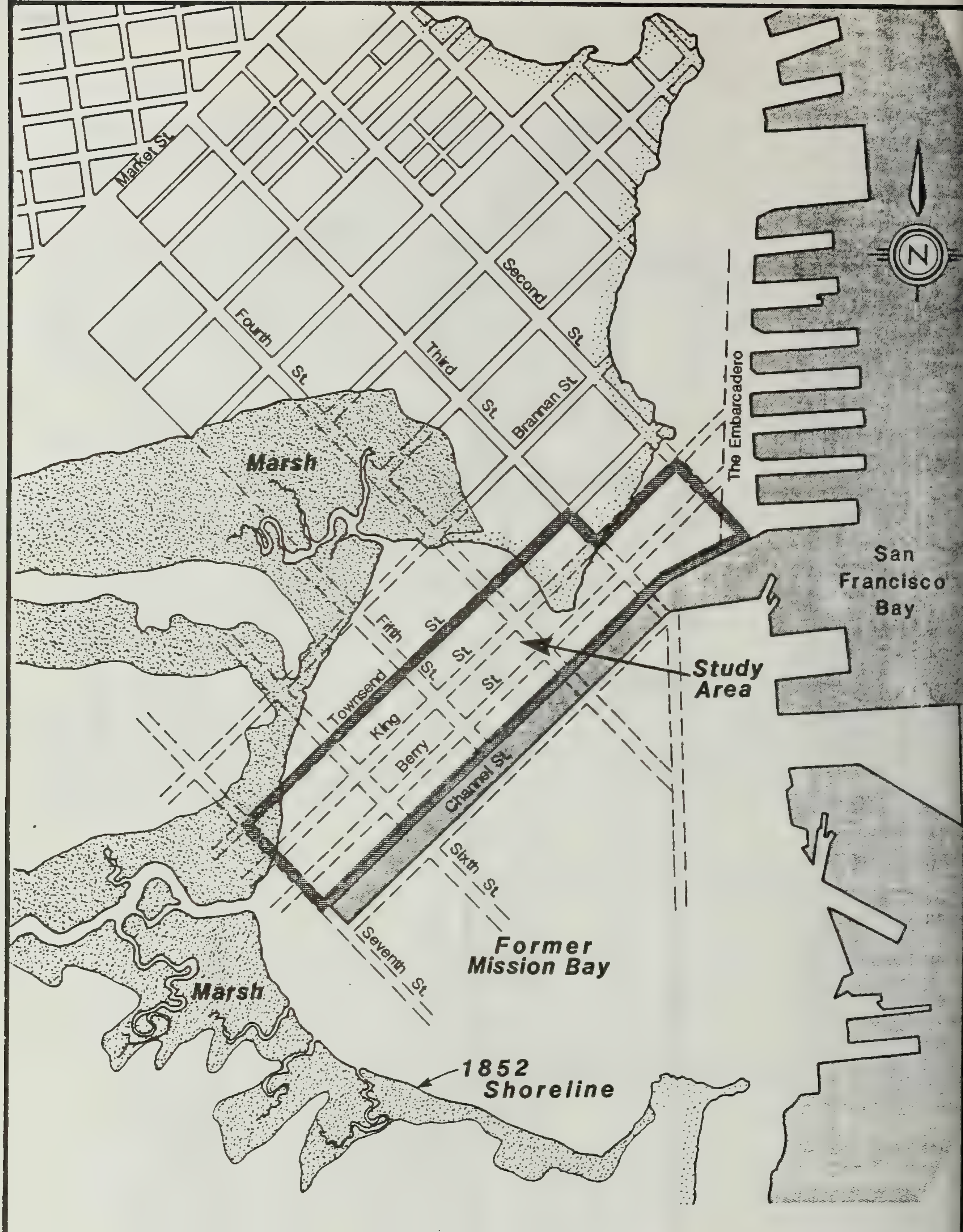
Site 14: Sheet piles should be driven into bedrock and/or the stiff/dense supporting soils. These soils were encountered at relatively shallow depths -- less than about 25 feet. Where refusal in rock is encountered above the bottom of the excavation, additional shoring of the rock will be required, as previously discussed.



HLA /GRC Test Boring Drilled for this Study
Test Boring Location
Study Area Boundary
Subsurface Cross Section
Site Number

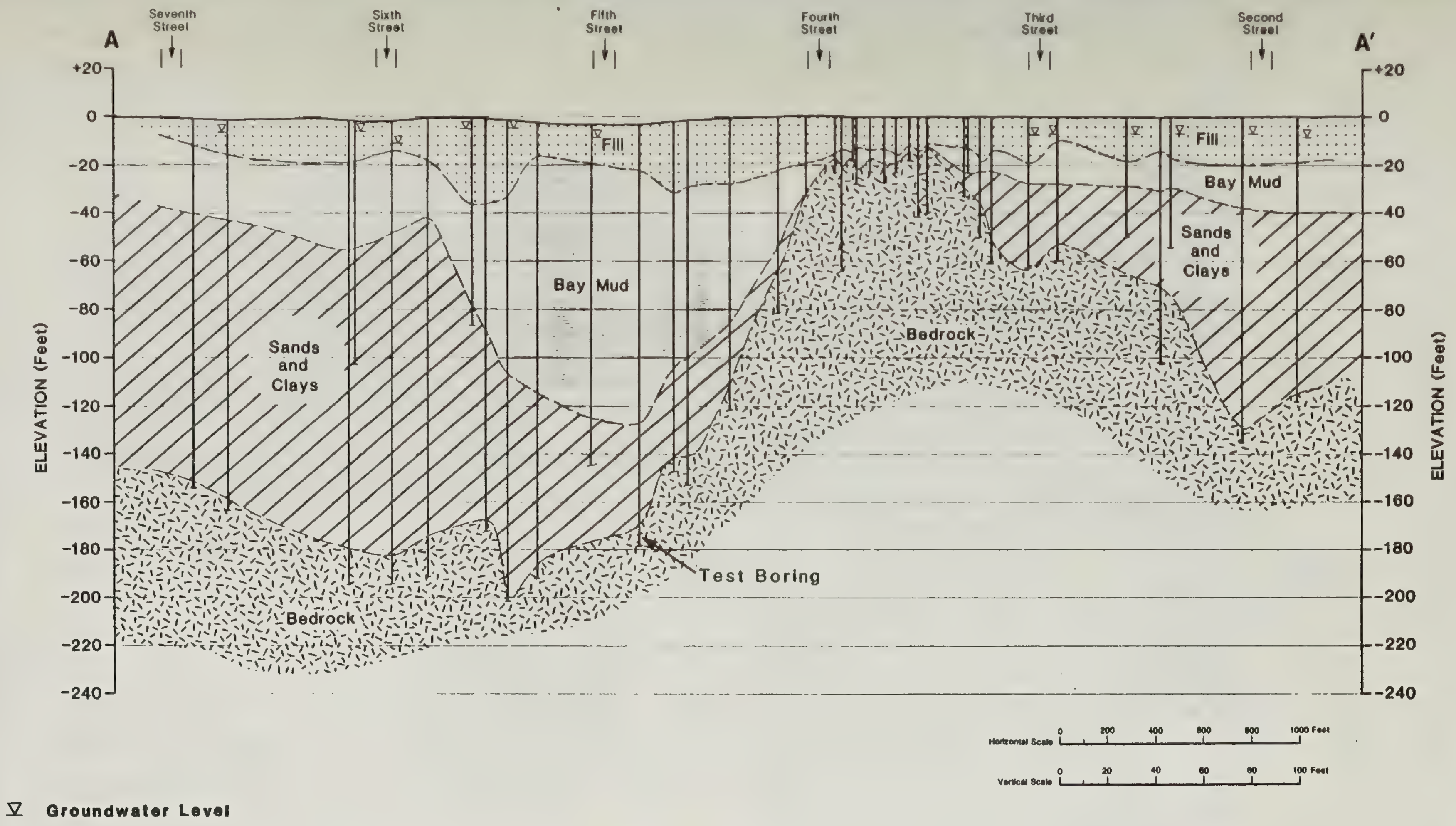
SITE PLAN

1



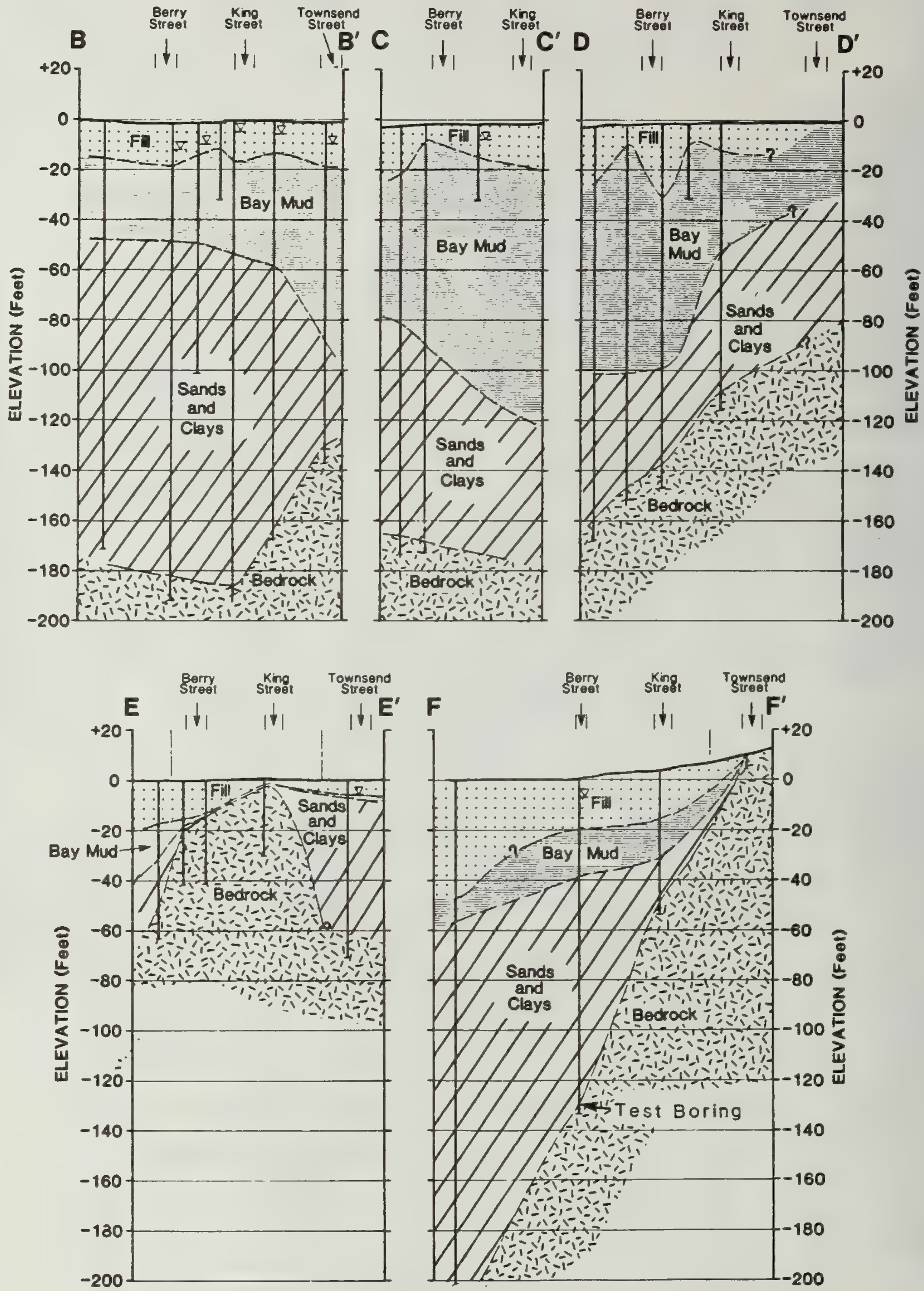
1852 SAN FRANCISCO BAY SHORELINE

2



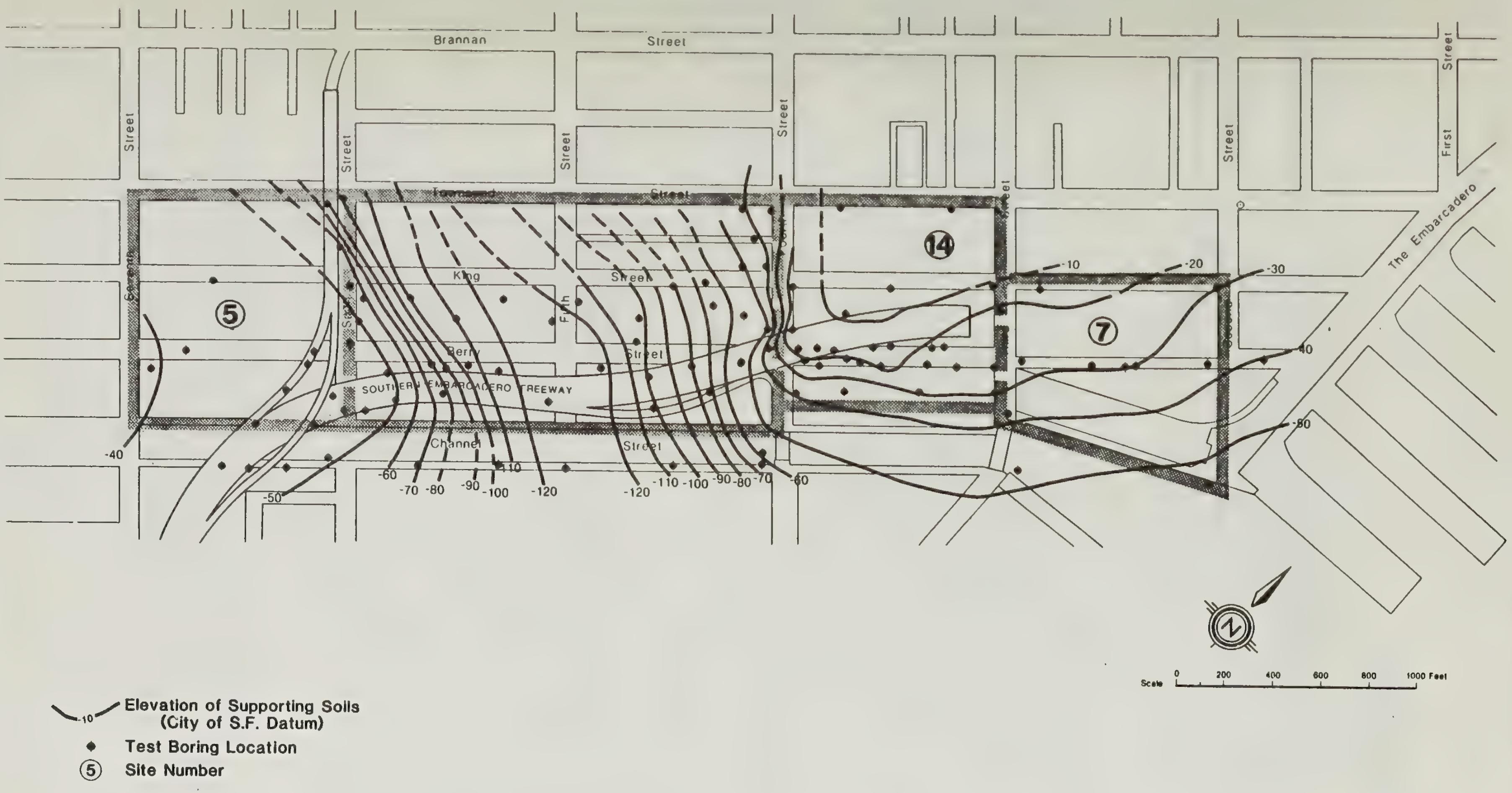
SUBSURFACE CROSS SECTION A-A'

3



∇ Groundwater Level

SUBSURFACE CROSS SECTIONS B-B', C-C', D-D', F-E', F-F' 4



ELEVATION OF SUPPORTING SOILS

5

C. ALTERNATIVES

Investigation of the urban planning, architectural and engineering alternatives required the establishment of a program "base." This program attempts to outline the space requirements of a complete and flexible multi-purpose stadium capable of staging major league athletic events such as football, baseball, soccer, basketball and hockey. In addition, the program establishes the space requirements for other entertainment events including, but not limited to, conventions, exhibitions, circus, rodeo, etc.

GENERAL REQUIREMENTS

The development and design of this facility shall be competitive in all respects with professional stadiums recently constructed or under construction, and meet with the requirements of all applicable building codes and ordinances. The basic form of the structure shall be designed to provide seating related to the desirable locations for viewing football, baseball, soccer, concerts and other events. The seating shall be as close to the playing field as desirable, sightlines shall be optimum, and viewing unobstructed by the structure. The stadium shall be enclosed and properly heated, cooled and ventilated. The grade or entrance level to the stadium shall be as near the middle of all seating as feasible to minimize the vertical travel distance to upper seating levels and shall have a minimum total capacity of 70,000 seats for football and 50,000 seats for baseball. Provisions for other events will be outlined in the program.

Each level shall be served by concession stands, vendors, commissaries, public toilets, and other facilities as further outlined in the Description of Stadium Facilities.

NEW MULTI-PURPOSE STADIUM PROGRAM GENERAL REQUIREMENTS

The purpose of this document is to set forth in outline form the requirements for the development of a multi-purpose stadium for San Francisco, California.

The development and design of this facility shall be competitive in all respects with professional stadiums recently constructed or under construction, and meet with the requirements of all applicable building codes and ordinances. The basic form of the structure shall be designed to provide seating related to the desirable locations for viewing of football, baseball, soccer, concerts and other events. The seating shall be as close to the playing field as desirable, sightlines shall be optimum, and viewing unobstructed by the structure. The stadium shall be enclosed and properly heated, cooled and ventilated. The stadium shall have a minimum total capacity of 70,000 seats for football and 50,000 seats for baseball. Provisions for other events will be outlined in the program.

Each level shall be served by concession stands, vendors, commissaries, public toilets, and other facilities as further outlined below.

STADIUM REQUIREMENTS

1. SPECTATOR FACILITIES

A. Seating

A minimum of 70,000 self-rising armchair seats for football shall be provided. Minimum sightline clearance shall be 2-1/4 inches above the eye level of the spectator in the preceding row. Minimum tread width in seating areas shall be 32 inches; the first row of seats shall be approximately 3'-6" above the field; riser height shall vary from 6 inches minimum to 22 1/2 inches maximum; the maximum number of seats per row shall be 24; and minimum aisle width shall be 44 inches. The minimum seat width shall be 19 inches. Baseball box seating shall have 8 seat rows.

A wheelchair seating area for a minimum of 70 wheelchair patrons and 70 attendants shall be provided. Handrails shall be provided at all vertical aisles in the upper level stands, at portals, at the front of all seating sections, and behind the back row of seats adjacent to concourses.

B. Public Toilets

Toilet rooms shall be provided for men and women at every concourse level and appropriately distributed. The ratio of spectator to fixtures shall be based on 60% male and 40% female attendance. Fixtures shall be provided based on the following approximations:

(1)	Lavatories	1 per 300 men 1 per 200 women
(2)	Waterclosets	1 per 500 men 1 per 100 women
(3)	Urinals	1 per 125 men (2 LF per 125 men)

Stainless steel urinal troughs shall be provided in men's units. Mirrors with shelves, soap dispensers, shelves above lavatories, paper dispensers, toilet partitions, and purse holders in women's units shall be provided. An attendants' closet with a service sink and storage shall be provided in each public toilet room.

Appropriate toilet facilities, including grab bars, etc., shall be provided adjacent to the wheelchair seating areas.

All toilet rooms shall be equipped with heat, general lighting and exhaust. Cold water service only shall be provided for all public toilet rooms.

C. Concession Stands

The following shall be subject to the recommendations and/or reasonable desires of the finally selected Concessionaire. However, the following shall reasonably describe the suggested concession requirements.

(1) Concession stands shall be located at all concourse levels and appropriately distributed and shall consist of three wall enclosures and roofs. The wall construction shall not be provided on the concourse side of the concession stands. Approximately six linear feet of serving counter shall be provided for each 400 spectators.

Each concession stand shall be provided with cold water, electrical service located on one wall, and floor drains.

(2) The following items are <u>not</u> included and shall be provided by the Concessionaire:

a. Completion of the concession stand including a counter and security door or screen as may be required at the concourse side.

b. Equipment such as cookers, warmers, beverage storage, freezers, coolers, plumbing fixtures, and the hook-up of same.

c. Exhaust systems as may be required.

d. General lighting, space heating, and water heating equipment.

e. Other equipment as may be necessary to provide a workable operation.

D. Vendors Commissaries

(1) These facilities for food handling and storage shall be located on all concourse levels and appropriately distributed. The commissaries shall be designed to provide service based on one vendor per 200 spectators.

Vendors' commissaries shall consist of four walls with roof. Each unit shall contain water service located on one wall, floor drains, and electrical service.

(2) The following items are not included and shall be provided by the Concessionaire:

a. Completion of the commissary including counters, screens, grills, etc.

b. Fixed equipment such as cookers, warmers, beverage storage, freezers, coolers, plumbing fixtures, and the hook-up of same.

c. Exhaust systems as may be required.

d. General lighting, space heating, and water heating as may be required.

e. Other equipment as may be required to provide a workable operation.

E. Ramps

Pedestrian ramps shall have a maximum 8 percent slope and adequate widths to provide easy accessibility to and from all concourse levels. All ramps shall be designed to accommodate vehicles as large as pickup trucks.

F. Public Telephones

Space and conduit for public telephones shall be provided at all concourse levels.

G. Ticket Booths

Ticket booths shall be provided for event ticket sales with adequate provisions for day-of-game sales. Counters, cash drawers, changeable letter panels, heat, lighting, and electrical outlets shall be provided. Handrails for crowd control shall be provided. Advance sales booths shall be conveniently located and accessible from outside or from within the stadium. A press gate and exchange gate will be provided. Four will-call windows shall be provided. If feasible, the advance sales window shall be adjacent to the ticket office.

H. Turnstiles

Portable, reversible, registering turnstiles and space for ticket takers shall be provided. One turnstile for each 1500 seats shall be provided. Turnstiles shall be covered to provide protection from precipitation, and railings for crowd control shall be provided.

I. Stadium Suites

A minimum of 180 suites shall be provided at the club level of the stadium. These facilities are enclosed lounge spaces with glazing on the field side, finished, furnished, and provided with heating and air conditioning. A built-in bar area is provided with refrigerator, sink, ice maker, closed circuit television, radio, P.A., and press box audio.

J. Loge Seating

A minimum of 8,000 loge level seats will be provided at the club level with access to exclusive lounge areas with bar, grill, and toilet facilities.

K. Stadium Club

Adequate area for the construction of a Stadium Club shall be provided within the stadium in addition to the concession stands, and shall be a minimum of 7,000 square feet and shall provide facilities for a minimum of 350 diners. Provide space only; completion by concessionaire.

L. Hall of Fame 2,000 Sq. Ft.

Accessible from within the stadium during events and from

outside the stadium during non-event times. Located within proximity to ticket office and Stadium Club areas.

M. Restaurant

Space for a public, cafeteria-type restaurant with private meeting rooms for separate, catered affairs shall be provided. The size is to be determined. Provide space only; completion by concessionaire.

N. Security 1,500 Sq. Ft.

For the security staff provide one office space for 30 lockers, restroom facilities, and a control booth located appropriately within the stadium. Provide a minimum of three lock-up cells, equipment room, a lounge/desk area for the Police Department.

O. First Aid - 2,000 Sq. Ft. Each

A facility for emergency medical treatment shall contain office spaces for a physician and nurse, cot room to accommodate six patients, waiting room, toilet and storage rooms. Medical equipment and supplies are not included. Access to ambulance parking through non-public areas shall be provided.

P. Drinking Fountains

Non-refrigerated drinking fountains shall be provided at all concourse levels. Refrigerated drinking fountains shall be provided for the team locker rooms, press, and administration areas.

Q. Sound System

A complete sound system shall serve the entire stadium to include distributed loud speaker system, speakers for gates, concourses, lobbies, ticket booths, concession stands, team rooms, offices, restaurants, and suites for event announcing, paging, music and broadcasting.

R. Elevators

The number and location of elevators is as shown on the drawings. Where freight elevators are provided, they shall be 8'-4" x 11' -9", 10,000 pounds capacity, and 75 F.P.M. speed. Passenger elevators shall be 5'-8" x 8'-8", 4,000 pounds capacity, and 350 F.P.M.

S. Escalators

Escalators shall be 48 inch wide reversible as shown on the drawings.

T. Graphics

Provisions shall be included for graphics for the entire stadium. The graphics shall provide signing as follows:

(1) Identification of stadium entrances, including ticket booths, turnstiles, and special entrances.

(2) Signing within the stadium to indicate concourse levels, seating sections, aisles, rows, and seat numbers.

(3) Identification of toilet rooms, first aid, exits and other public facilities.

(4) Identification of concession facilities is not included; however, concession stand signing shall be coordinated with the total graphics program.

U. Lighting

Adequate general illumination shall be provided throughout the stadium for concourses, stairs, ramps, portals, etc.

V. Fire Protection

Fire protection equipment such as sprinklers, standpipes, etc., shall be provided as required by applicable building and safety codes.

W. Permanent Novelty Stands

A permanent novelty stand shall be provided at appropriate locations through the facility. Minimum storage space of 2,000 square feet is also required.

2. PRESS FACILITIES

A. Press Box

Press box facilities accommodating the news media covering football and baseball shall be provided appropriately located and oriented within the stadium. Two levels shall be provided in each press box: One for the working press and one for the broadcast media. The press box will be open to the field except for the P.A. announcer, which will have a glass front.

The press box facilities shall be provided with appropriate HVAC systems.

Open-tray conduit for TV cables shall be provided from all TV camera and broadcasting booth locations to TV van parking locations.

Football

(1) Working Press - 3,000 Sq. Ft.

Stations for approximately 150-160 writers shall be provided. This area shall contain built-in writing counters, electrical outlets, sound system, and closed circuit television. Chairs for writers are not included.

(2) TV Broadcasting - 320 Sq. Ft. (2 Required)

The TV broadcasting booth shall be provided with built-in counter, special acoustical treatment on walls and ceiling, and space for 50 yard line cameras. Additional TV camera platforms shall be located at the 25 yard lines and each end zone. The TV network shall be consulted regarding all aspects including booth, platforms, conduit, and electrical requirements.

(3) Broadcasting - 120 Sq. Ft. Each (3 Required)

Provide three broadcasting booths with built-in counters, special acoustical treatment on walls and ceiling.

(4) Coaches - 100 Sq. Ft. Each (2 Required)

The spaces for home and visiting team coaches shall contain built-in writing desks and phone connections to team benches.

(5) Film - 200 Sq. Ft.

Area to be open on the field side, a minimum of 10 spaces shall accommodate photographers. Counters shall be provided.

(6) Owner's Box - 560 Sq. Ft.

For use by the stadium tenant, this space shall provide seating for approximately 24 people. All special interior finishes shall be provided by the team owner.

(7) General Manager's Box - 280 Sq. Ft.

For use by stadium tenant, shall provide space for eight people.

(8) Vising Owner's Box - 280 Sq. Ft.

Shall provide space for 12 people.

(9) VIP Box - 280 Sq. Ft.

For use by the stadium guests, shall provide space for 12 people.

(10) Public Address Announcer - 100 Sq. Ft. (Enclosed)

This space for announcer and assistants with built-in counter will contain all controls required for a public address system serving the entire stadium.

(11) Workroom- 200 Sq. Ft.

Space adjacent to the working press shall be provided for statisticians, document reproduction, and telecopy equipment.

(12) Toilets

Men and women toilet facilities for the press shall be provided at each level.

Baseball

(1) Working Press - 2,500 Sq. Ft.

Stations for approximately 120-150 writers shall be provided. This area shall contain built-in writing counters, electrical outlets, sound system, and closed circuit television. Chairs for writers are not included.

(2) TV Broadcasting - 320 Sq. Ft. Each (3 Required)

Provide three TV broadcasting booths with built-in counter, special acoustical treatment on walls and ceiling, and space for one home plate camera. Additional TV camera platforms shall be located at the base lines, home plate, and centerfield. The TV network shall be consulted regarding all aspects, including booth, platforms, conduit, and electrical requirements.

(3) Broadcasting - 120 Sq. Ft. Each (5 Required)

Provide five broadcasting booths with built-in counters and special acoustical treatment on walls and ceiling.

(4) Film - 300 Sq. Ft.

Provide a minimum of 15 spaces to accommodate photographers, with counters.

(5) Owner's Box - 560 Sq. Ft.

For use by the stadium tenant, this space shall be near the press box and provide seating for approximately 24 people. All specific interior finishes shall be provided by the team owner.

(6) General Manager's Box - 280 Sq. Ft.

For use by stadium tenant, shall provide space for eight people.

(7) VIP Box - 280 Sq. Ft.

For use by the stadium guests, shall provide space for 12 people.

(8) Scoreboard Operator - 250 Sq. Ft.

This space shall be provided with built-in writing counters. All wiring, control panels, and other equipment required for operation of the scoreboard equipment shall be by the scoreboard company.

(9) Public Address Booth - 150 Sq. Ft. (Enclosed)

A portion of this space will be for the P.A. announcer and assistants with built-in counters.

(10) Public Address Control Booth - 150 Sq. Ft.

An engineer's space will contain all controls required for a public address system serving the entire stadium.

(11) Workroom- 200 Sq. Ft.

Space adjacent to the working press shall be provided for statisticians, document reproduction, and telecopy equipment.

(12) Toilets

Men and women toilet facilities for the press shall be provided at each level.

Common Facilities

(1) Darkrooms - 200 Sq. Ft. (2 Required)

Provide two darkrooms located at the playing field level with rough-in electrical and plumbing. Additional equipment shall be provided by others.

(2) Player Interview Room - 300 Sq. Ft (2 Required)

Two interview spaces for TV broadcasts shall be provided convenient to both home and visitors' locker rooms. These rooms shall be accessible by TV cable tray, and electrical requirements shall be provided. TV networks shall be consulted.

(3) Press Club - 2,000 Sq. Ft.

For press personnel, this facility shall contain a dining room seating approximately 50 persons and rough-in plumbing and electrical service for food and beverage service. Equipment and hook-up of same shall be adjacent to the working press box. If space is available, one would be provided adjacent to each sports box.

(4) Equipment

Adequate space for sound system, telephone, electrical, and TV equipment shall be provided.

(5) Studio Space 800 Sq. Ft.

Provide space for the development of a television studio.

3. ADMINISTRATIVE FACILITIES

A. Offices

Stadium Administrative Offices will be complete with finished walls, floors and ceilings, general lighting, heating and air conditioning.

Space available for teams and future development of administrative offices will have enclosing unfinished perimeter walls only. Plumbing, electrical, heating, and air conditioning will not be included, although the capability to extend these services is available.

A suggested allocation of administrative office space is as follows:

a. Stadium Operation

2,000 square feet finished.

b. Home Baseball Team

10,000 square feet unfinished; 2,000 square feet available for future development.

c. Home Football Team

2,000 square feet unfinished adjacent to ticket office.

d. Home Soccer and Basketball Team

6,000 square feet available each for future development.

B. Ticket Sales

Space for ticket sales shall be provided for the stadium and each home team. The stadium spaces shall be completely finished and the team spaces shall be unfinished. Space allocations for each shall be 1,200 square feet with 300 square feet available for future development.

4. TEAM FACILITIES

All team facilities shall be located at the playing field level and have direct access to the playing field. One passenger elevator shall provide direct access to the Football Press Box. Visiting locker rooms shall be complete unless otherwise indicated to include heating, air conditioning, finished walls, carpeted floors, ceilings, and general lighting. Provide space only for home football and home baseball locker rooms.

A service drive for access by truck shall be provided to the team locker facilities.

A. Football Home Team - 10,000 Sq. Ft. (Unfinished)

B. Baseball Locker Room - 10,000 Sq. Ft. (Unfinished)

C. Vistors Lockers - 2,500 Sq. Ft. Each (2 Required)

	Square Feet
1. Locker Room including lockers	1,400
2. Shower and toilet room	400
3. Training room - Electrical and plumbing rough-in for training equipment. Training equipment provided by others.	300

	Square Feet
4. Coaches' Locker	200
5. General Storage	200

D. Officials' Locker - 350 Sq. Ft. (2 Required)

Separate locker rooms shall be provided for game officials and chain crews.

	Square Feet
1. Locker room including 10 lockers	200
2. Shower and toilet rooms	150

E. Field Equipment Storage Room - 5,000 Sq. Ft.

Adjacent to field. Provide one small space near each dugout at the field level.

F. Field Toilet- 85 Sq. Ft.

Adjacent to field. One watercloset, urinal, lavatory, and refrigerated drinking fountain shall be provided.

G. Team Photographers Platforms (2 Required)

Enclosed booths for team photographers located at the top of the upper level seating at the 50 yard line and end zone for football. For baseball provide platform behind home plate, first base, and third base. Space for four photographers with counter and electrical power.

H. X-Ray Room - 200 Sq. Ft.

Adjacent to team facilities and accessible from the playing field, this facility shall make provision for X-ray equipment for use by both teams during games.

I. Player's Relatives Waiting Room - 500 Sq. Ft.

Post game waiting room with toilet facilities for men and women. Location to be central to all sports locker rooms.

5. STADIUM SERVICE FACILITIES

The stadium service facilities shall be located within the stadium, as appropriate.

Access by service vehicles shall be provided to all facilities. These facilities shall relate to the freight elevators provided within the stadium.

A. Concession Storage - 10,000 Sq. Ft.

Enclosed space for development of offices, food handling, preparation, and storage facilities. Finishing and equipment for this space and equipment hook-up shall be provided by the Concessionaire.

B. Concession Lockers- 2,500 Sq. Ft.

Space only for toilet and dressing facilities and uniform storage for approximately 500 male and female employees. Finishing of this space to be by the concessionaire.

C. Stadium Personnel Lockers - 2,500 Sq. Ft.

Adequate toilet, dressing, and uniform storage facilities for approximately 500 male and female stadium employees.

D. Band Locker - 3,600 Sq. Ft.

This enclosed finished space for men's and women's toilet and dressing rooms.

E. Maintenance Locker and Office - 1,000 Sq. Ft.

Twenty lockers plus toilet facilities for stadium and field maintenance personnel. Finished space including heating, air conditioning, and lighting shall be provided.

F. Maintenance Shop - 2,000 Sq. Ft.

Enclosed facilities for general maintenance of the stadium. Heating, ventilating, general lighting shall be provided.

G. Field Maintenance Storage - 5,000 Sq. Ft.

Provided for storage of equipment and materials required for maintenance of the playing field. General lighting and security fence shall be provided. This area must be within the stadium and adjacent to the playing field.

H. Loading Dock

A three-position truck dock with manual dock levelers shall be provided at the entrance to the service facilities. The dock shall be adjacent to the concession and maintenance facilities and the freight elevators.

I. Trash Compactor

Space for two mechanical, self-loading trash compactors

with trash chutes and all utilities permanently located at the exterior loading dock for processing all refuse. Also provide space for secured storage of trash bins.

J. Mechanical Equipment

Space for mechanical, electrical, sound, scoreboard, and telephone equipment shall be provided, as required, throughout the stadium.

K. Television Van Parking

Parking for television vans shall be provided adjacent to the stadium as close to the press box facilities as feasible. Adjacent electrical and telephone equipment rooms and toilet facilities shall be provided along with a food service space. The television networks shall be consulted.

6. PLAYING FIELD FACILITIES

A. Playing Field

A removable synthetic turf playing surface with warning track shall be provided for football, baseball, and soccer. The necessary equipment to remove the synthetic turf is also included. A grid trough system will be supplied below the field surface for electrical service distribution, field mikes, etc. adequate for serving all events. Drainage, as required, shall be included.

The playing field area shall be designed for an international soccer field 70 yards in width by 110 yards in length. A football field 53.3 yards wide by 120 yards in length and a baseball field 325 feet at right and left field foul lines and 400 feet at center field.

B. Game Equipment - Football, Soccer

Football goal posts (professional and collegiate), corner flags, soccer goals, team benches, and telephone service for team benches, kicking screen, and power for 30 second clocks shall be provided.

C. Game Equipment - Baseball

Foul ball poles, batter's eye, and foul screen behind home plate shall be provided.

E. Player-Dugouts - Baseball

Covered dugouts with direct access to the locker rooms

will be provided for home and visiting teams, with toilet, drinking fountain and telephone service to the bull pen, press area and switchboard.

F. Pitcher's Bull Pen - Baseball

Two pitcher's bull pen areas will be provided with utilities.

G. Batting Cage- Baseball

Space for a batting cage will be provided under the grandstand area.

H. Field Entrances

Access shall be provided as required and appropriate to allow over the road vehicles to reach the playing surface for maintenance and event setup.

Additional entrances for players or from the lower stand shall be provided as required.

I. Field Lighting

A complete field lighting system providing adequate illumination for color television coverage shall be provided. The television networks shall be consulted.

J. Scoreboard

Space only for a complete, electrically operated, remote controlled, illuminated scoreboard system with "instant replay" capability shall be provided. The scoreboard system shall include all remote control equipment located in the press box, control wiring and scoreboards.

Supplemental scoreboards shall be provided as required. The scoreboard system and installation shall be by others.

K. Security

Appropriate security against illegal entry to or improper access within the stadium to include fencing, walls, gates, and doors shall be provided.

7. OTHER EVENTS

In addition to baseball, football and soccer the domed facility would lend itself and could be adopted to many other sports or non-sports events. Utilizing moveable seating sections numerous seating arrangements can be accomplished.

Examples of these are shown in the drawings. The following is a list of some of the other potential events.

Sports	Baseketball
	Hocky
	Indoor Soccer
	Indoor Track and Field
	Motocross
	Tennis
	Equestrian events
	Boxing
	Rodeo
Non-Sports	Circus
	Ice Shows
	Theatrical Events
	Musical Events
	Community Events
	Religious Events
	Conventions
	Trade Shows
	Consumer Shows

8. ITEMS OF WORK NOT INCLUDED

The following items are not included and shall be provided by others:

A. Special architectural finishes (for example, wood paneling, vinyl wall covering, etc.).

B. Carpet and drapery except as noted.

C. Any movable furniture or equipment in interior spaces. (Lockers are included as noted).

D. Maintenance equipment (carts, tractors, wagons, tools, trash carts, etc.).

E. Free-standing trash receptacles or similar maintenance articles.

F. Portable or free-standing novelty booths and/or display cabinets and racks.

G. Kitchen and food handling equipment for concession operation.

H. Playing surfaces and equipment for basketball, track and field, hockey or other sports' events outside of football and baseball.

ALTERNATES

Using the program as a base for planning, the study team has investigated the following stadia shapes, structural forms and systems and has selected the form, described above, for demonstration purposes.

COMPARISON OF STADIUM TYPES

Four basic stadium shapes were investigated for their desirability in providing the requirements for a multi-purpose facility. These shapes are the circle, the octagon, the horseshoe, and the ellipse. All will provide the requirements outlined in the New Stadium Program. Following is a general discussion of the four types.

CIRCLE

This shape or its' derivative, the octarad, is the one chosen to develope in this study. There are a couple of major reasons for this choice.

First of all, because of the discrepancy in playing field areas for two of the major sports, baseball and football, it is difficult to orient seating to equitably accommodate each sport without generating compromises to each. The circle comes closest of all types to making this accommodation as shown in the stadium types plan drawings.

Secondly, a portion of this study involves the investigation of roof types; steel, wood, cable, and air supported. The circular scheme is the only shape which can easily accommodate the rigid types of roof structures and thus allow a comparison of the roof types to be made.

OCTAGON

This shape can also meet the requirement for a symetrical seating arrangement about baseball and football. A problem with this shape is in achieving the seating arrangements. Significant sections of seating are required to be movable and/or retractable. There are approximately 4000 seats installed, above the requirements, which are not used in the maximum seating configuration for football.

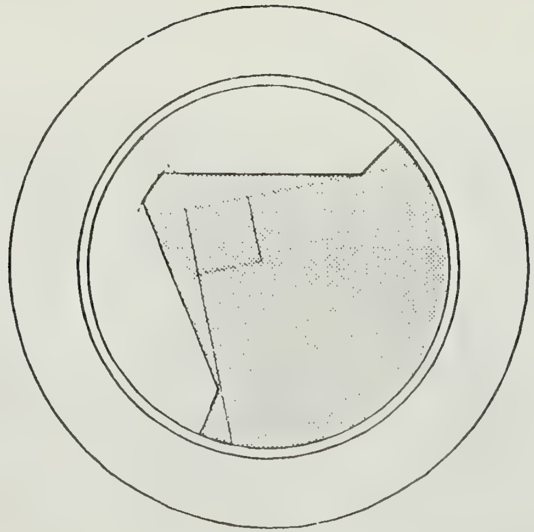
HORSESHOE

This shape offers a reduced width for a site with size restrictions, but results in an increase in length. It also offers a facilities building in the non-seating end of the stadium. Rigid roof systems are not accommodated with this scheme. This facility orients well toward football, but starts to lose its ability to clearly orient toward baseball.

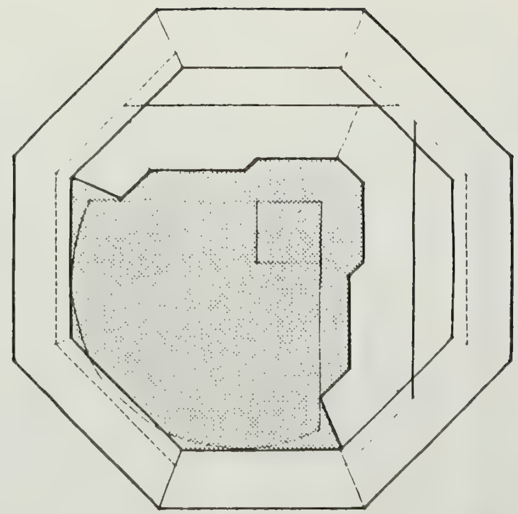
ELLIPSE

The ellipse shape is the most compact of the stadium types and

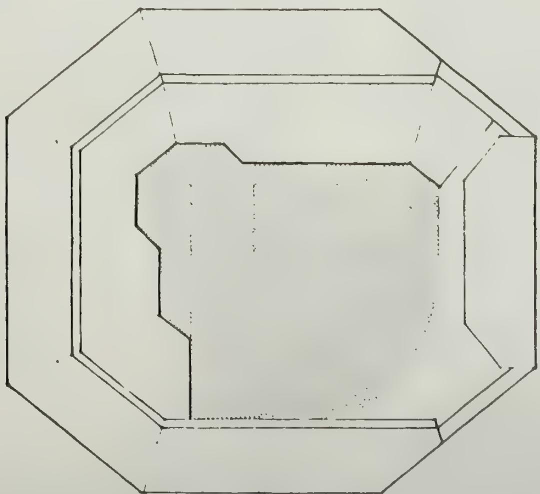
thus becomes the choice where severe site restrictions exist. Rigid roof types are not accommodated on this shape. This shape specifically orients toward football and the playing of baseball is severely compromised both in the seating layout and the playing area provided.



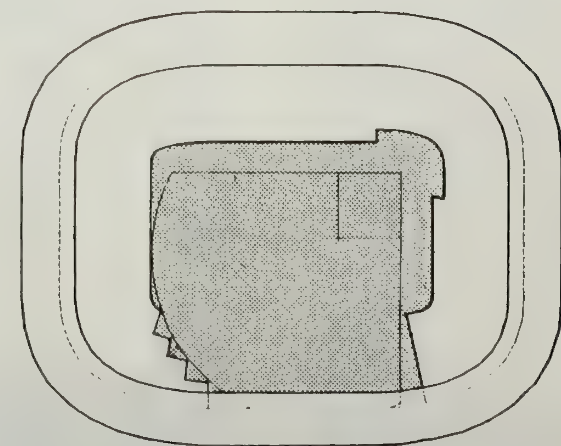
CIRCLE



OCTAGON

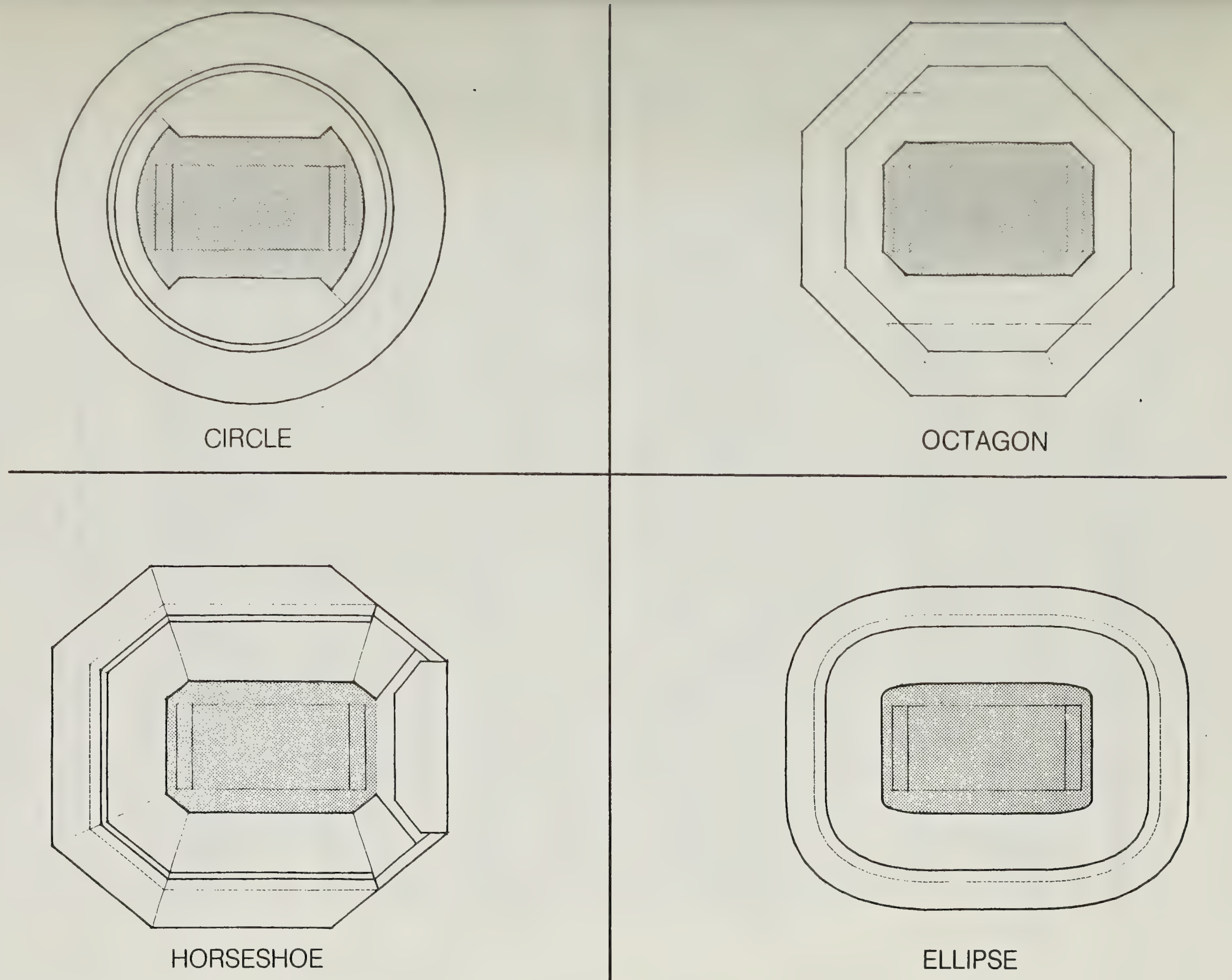


HORSESHOE



ELLIPSE

STADIUM TYPES—BASEBALL



STADIUM TYPES—FOOTBALL

COMPARISON OF ROOF STRUCTURAL SYSTEMS

AIR SUPPORTED ROOF

The air supported roof system is similar to that use in the following professional stadiums:

The Silverdome - Pontiac, Michigan
The Metrodome - Minneapolis, Minn.
B.C. Place Amphitheater - Vancouver, B.C.
The Hoosier Dome - Indianapolis, Indiana

The span of these roofs is in some cases greater than that of the San Francisco Stadium.

This roof system has proved to be largely trouble free in areas that do not require snowmelt as in the San Francisco area. In areas where snow melt systems are required, there have on occasions been problems related to maintenance of mechanical systems, availability of steam, reliability of controls and the like. In some situations, this has resulted in the failure of a roof panel and its' resultant replacement.

The roof membrane, teflon coated fiberglas has proven to be resistant to ultraviolet and sufficiently flexible not to deteriorate due to thermal stress and roof movements. These materials have been used in air structures in the U.S. since 1974. There has been no case of membrane replacement due to deterioration. The expected membrane life is from 20 to 30 years.

One of the major advantages of this type of roof is the translucent membrane which allows for uniform natural light within the facility while creating a feeling of being outdoors.

THE CABLE DOME - FIXED ROOF

The cable dome is a tension structure using membranes similar to those defined above. Tension structures have found many applications since the construction of the LaVerne College fieldhouse in Log Angeles in 1972. The largest tension structures to date is the 100 acre roof in Jeddah Saudi Arabia. To date, there has not been a tension structure application for a stadium. Consequently, the design proposed here would be a first.

Since a mechanical air handling system is not required, one would expect overall performance superior to that of the air structures roof outlined above.

The translucency characteristics would be similar to that for an air supported roof.

THE CABLE DOME - RETRACTABLE CENTER SECTIONS

The Cable Dome has the opportunity for a 300 foor diameter retractable center section, thus enhancing the feeling of being outdoors in good weather. This feature is not expected to add to the first cost, but will require a replacement cost of the center sections of approximately $500,000 every 10 years. THe retracted roof will be stored in a gondula 20 feet in diameter and 20 feet high, more than 200 feet above the center of the field.

STEEL DOME

The steel dome proposed is similar to that used in the Astrodome in Houston, Texas and the Superdome in New Orleans. With the rigid roofs, there is a serious problem due to roof membrane deterioration. The Astrodome roof was reroofed after ten years at a cost of $3 million (1974 dollars -- see Engineering News Record -- March 28, 1974). The Superdome roof is currently being replaced after eight years at a cost of $4.5 million - Engineering News Record - August 5, 1984.

These steel domes are of slightly smaller span than the dome considered for San Francisco.

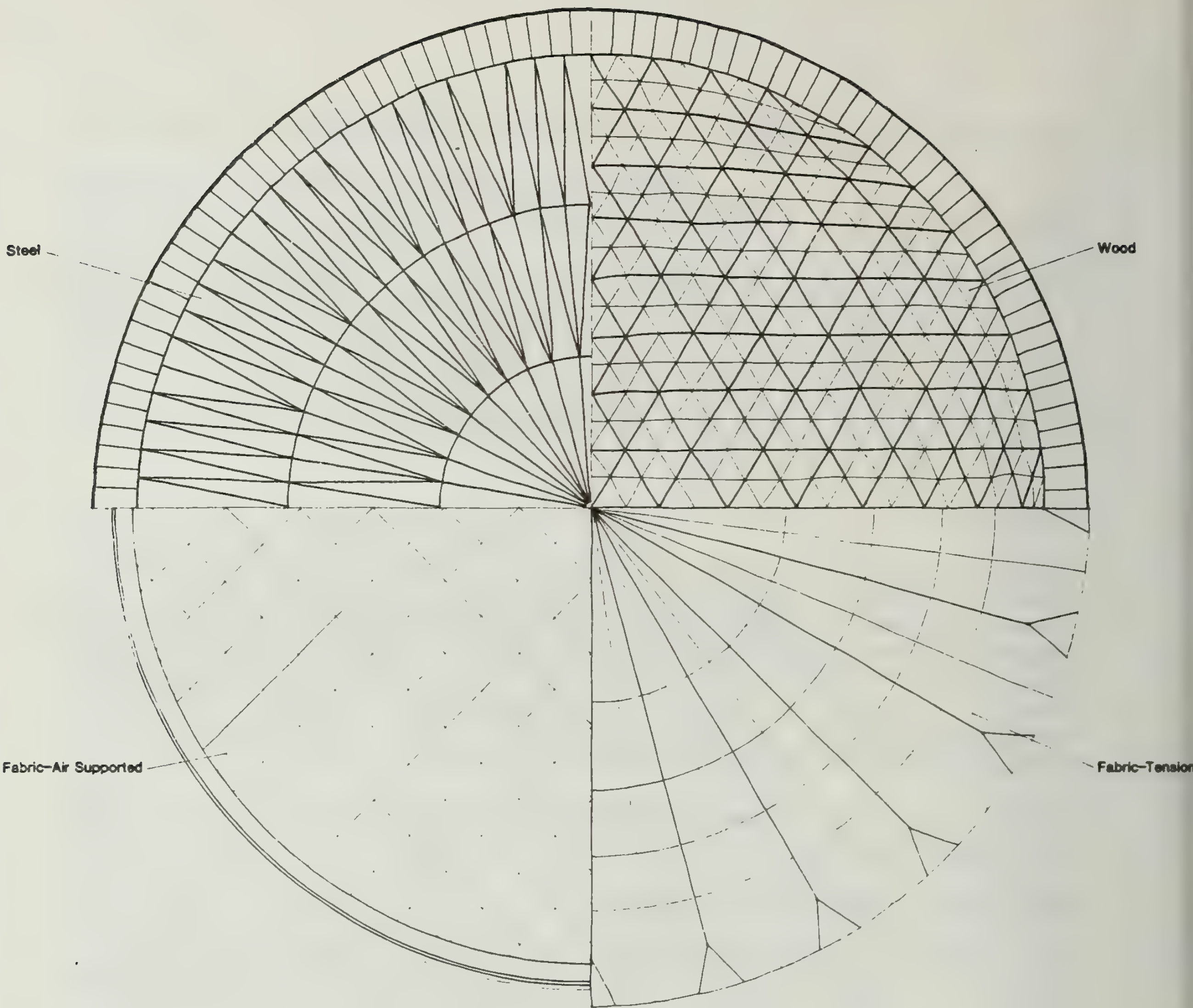
WOOD DOME - WITH FABRIC ROOF

The wood dome being considered is similar to the wood domes used in Flagstaff, Arizona and Tacoma, Washington, the largest of which is 530 feet in diameter considerably less than 700 foot diameter roof being considered for San Francisco.

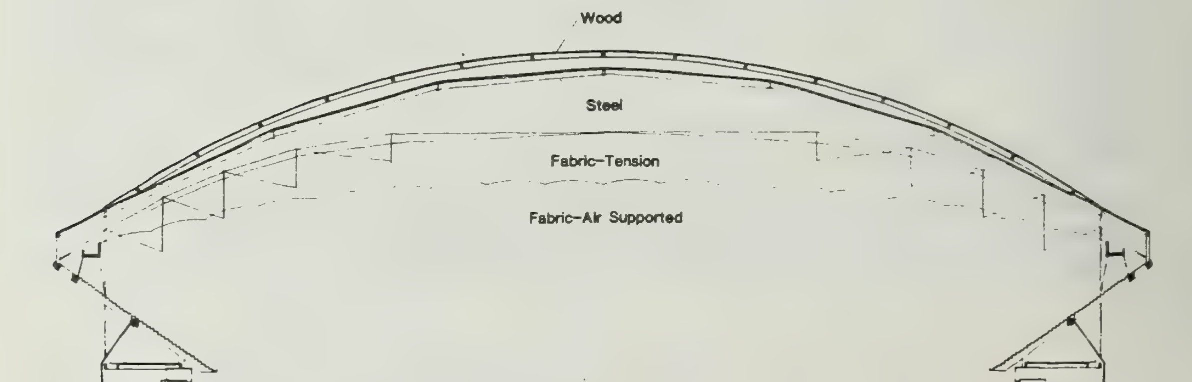
In order for it to be possible to have the trouble free roof with the permanent roof fabrics, the proposal herein considers the permanent roof fabric as the roof deck and waterproofing membrane. This permits natural lighting of the interior.

CONCRETE DOME

The Concrete Dome used in the Kingdome was not considered here because of the much larger span and seismic loading, which together make this concrete dome impractical.



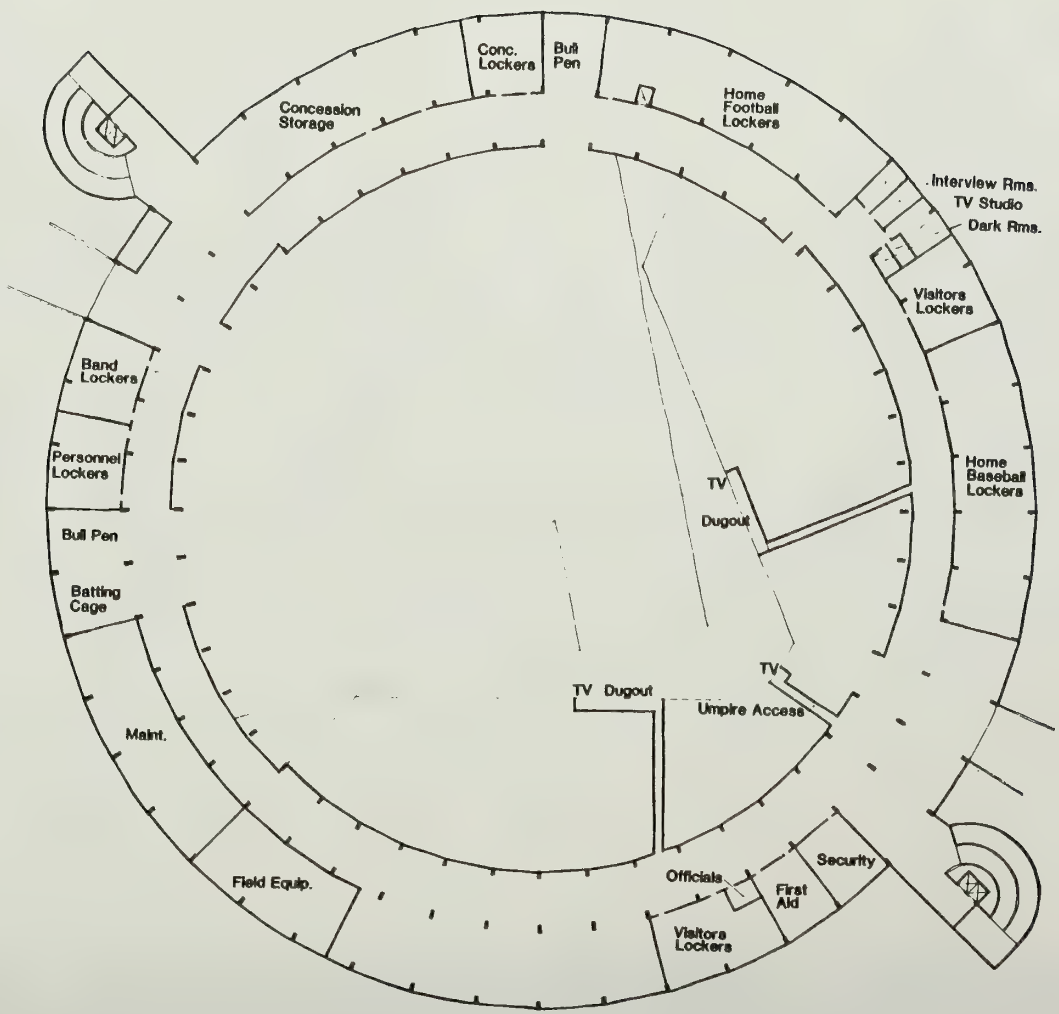
PLAN — ROOF TYPES



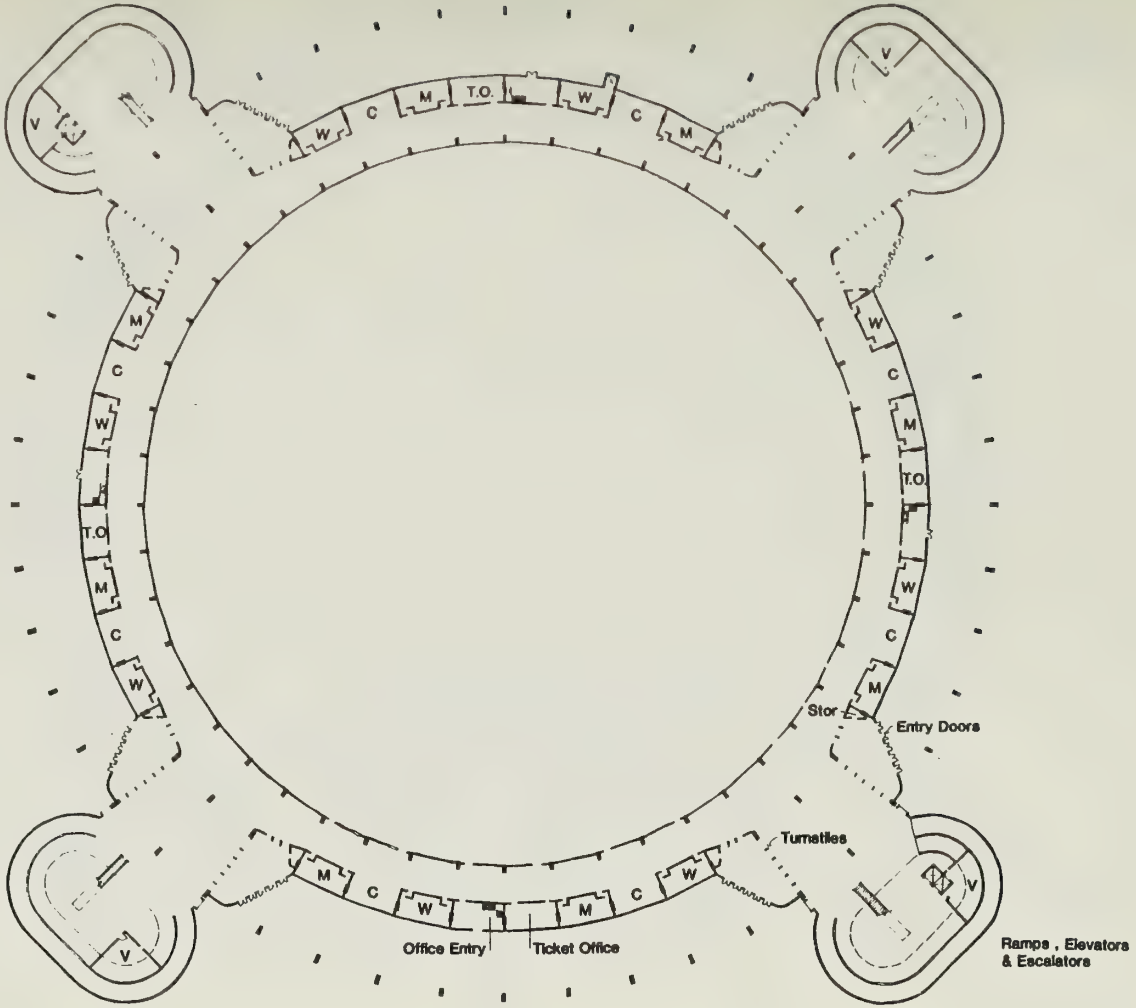
COMPOSITE SECTION — ROOF TYPES

DEMONSTRATION STUDY

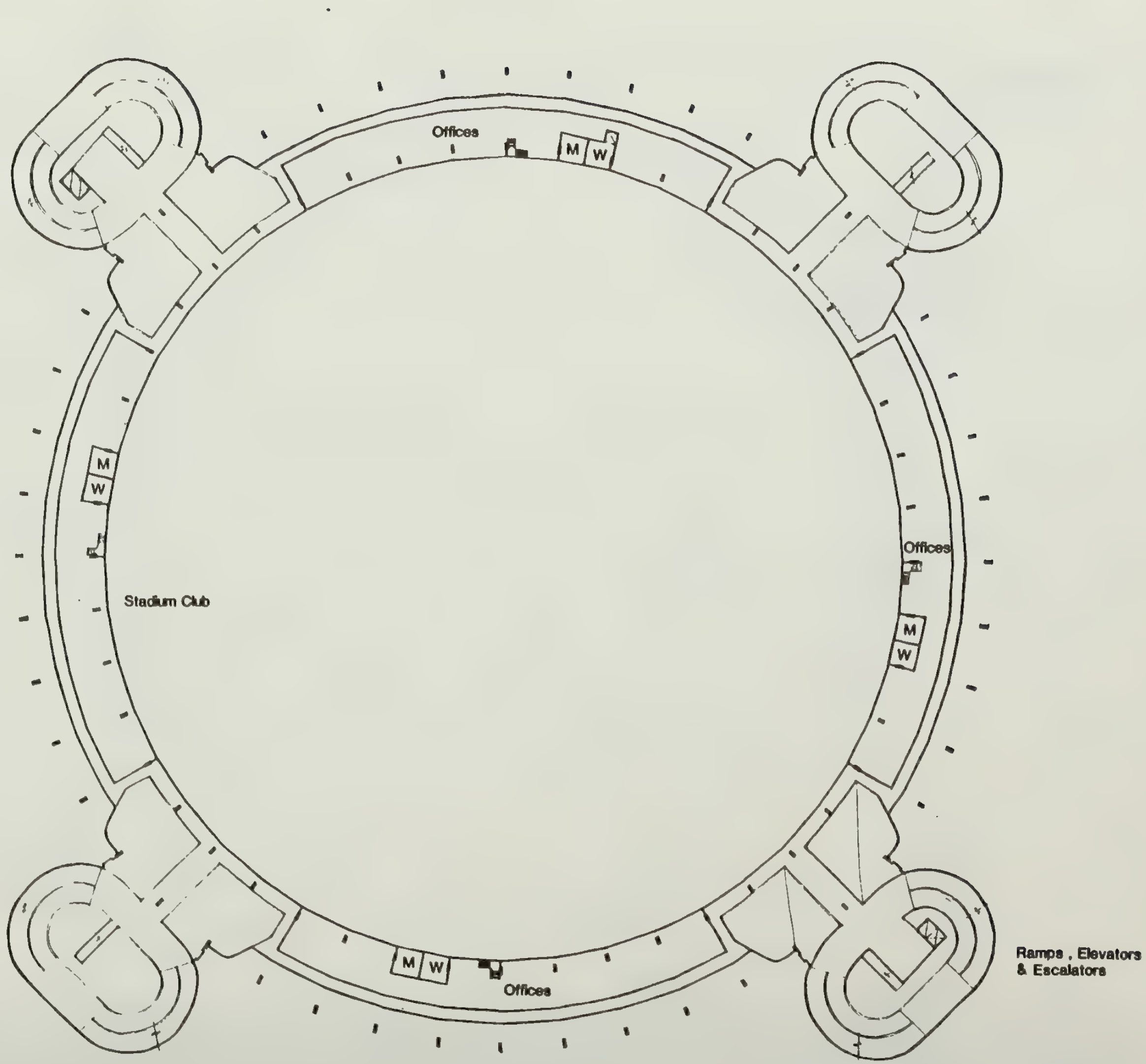
The plans represented below show what the design/study team feels to be a reasonable response to the urban planning needs in the south of Market area, as well as to the program and the needs for a new downtown stadium.



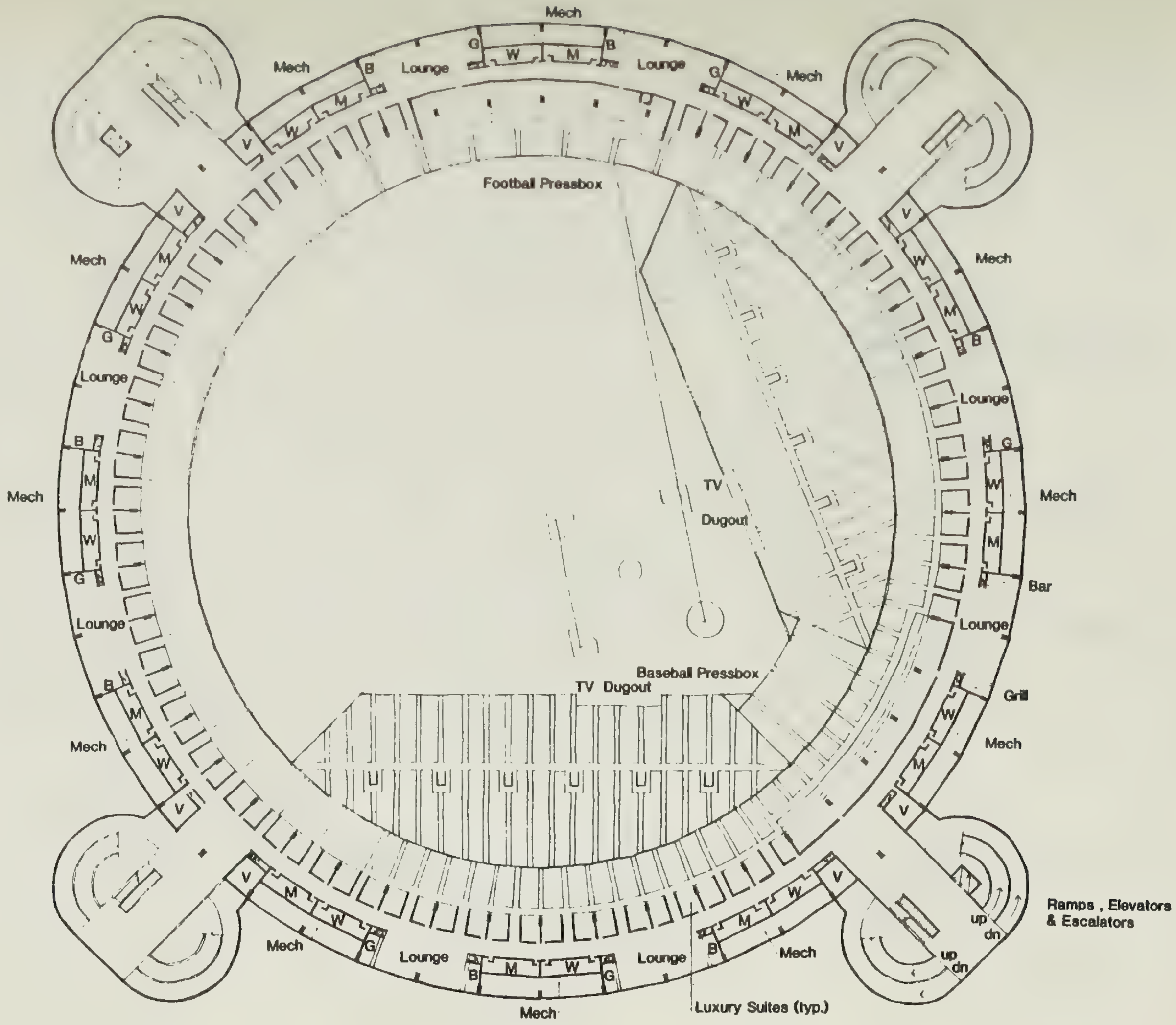
FIELD LEVEL PLAN



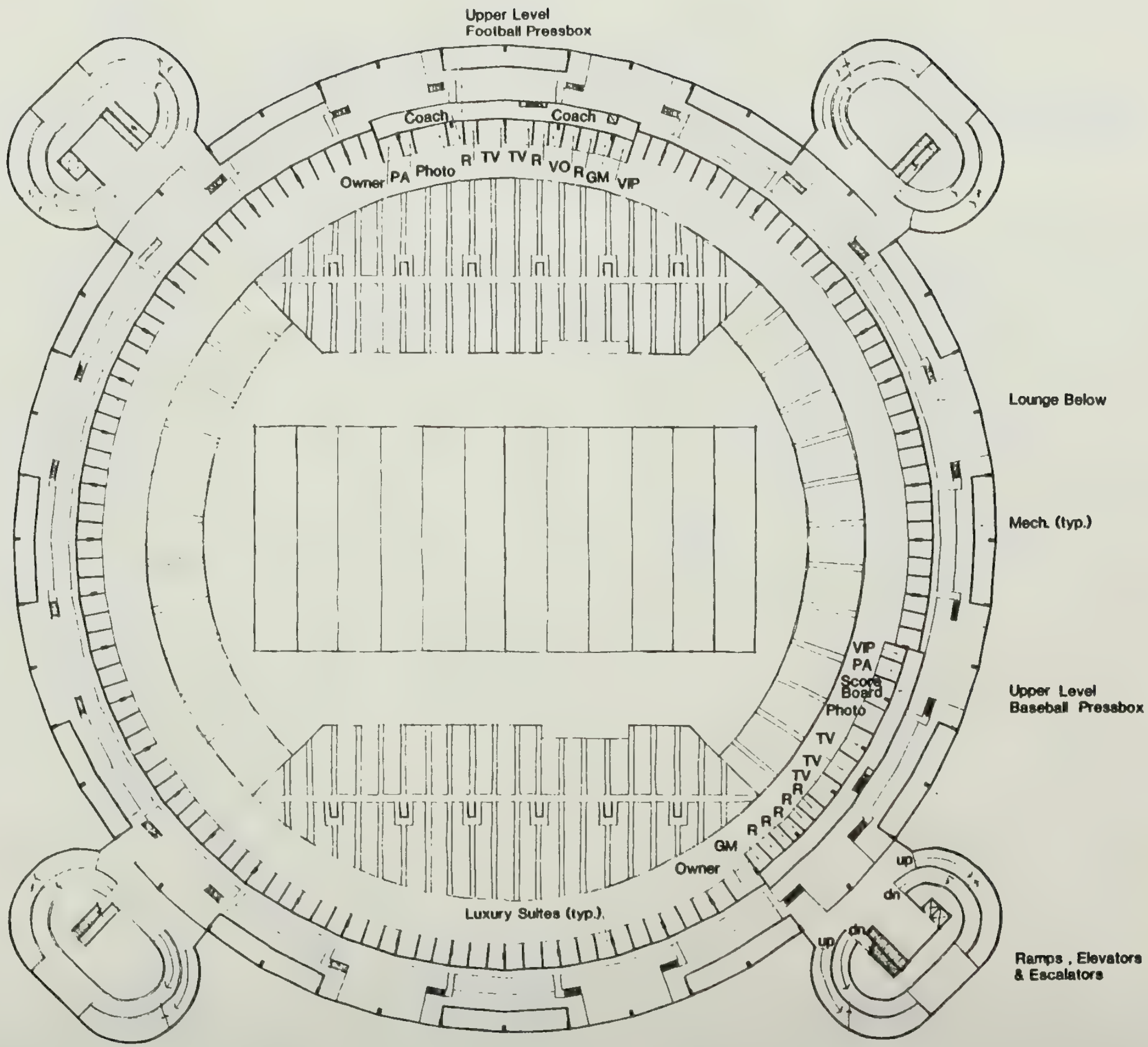
LOWER DECK CONCOURSE PLAN



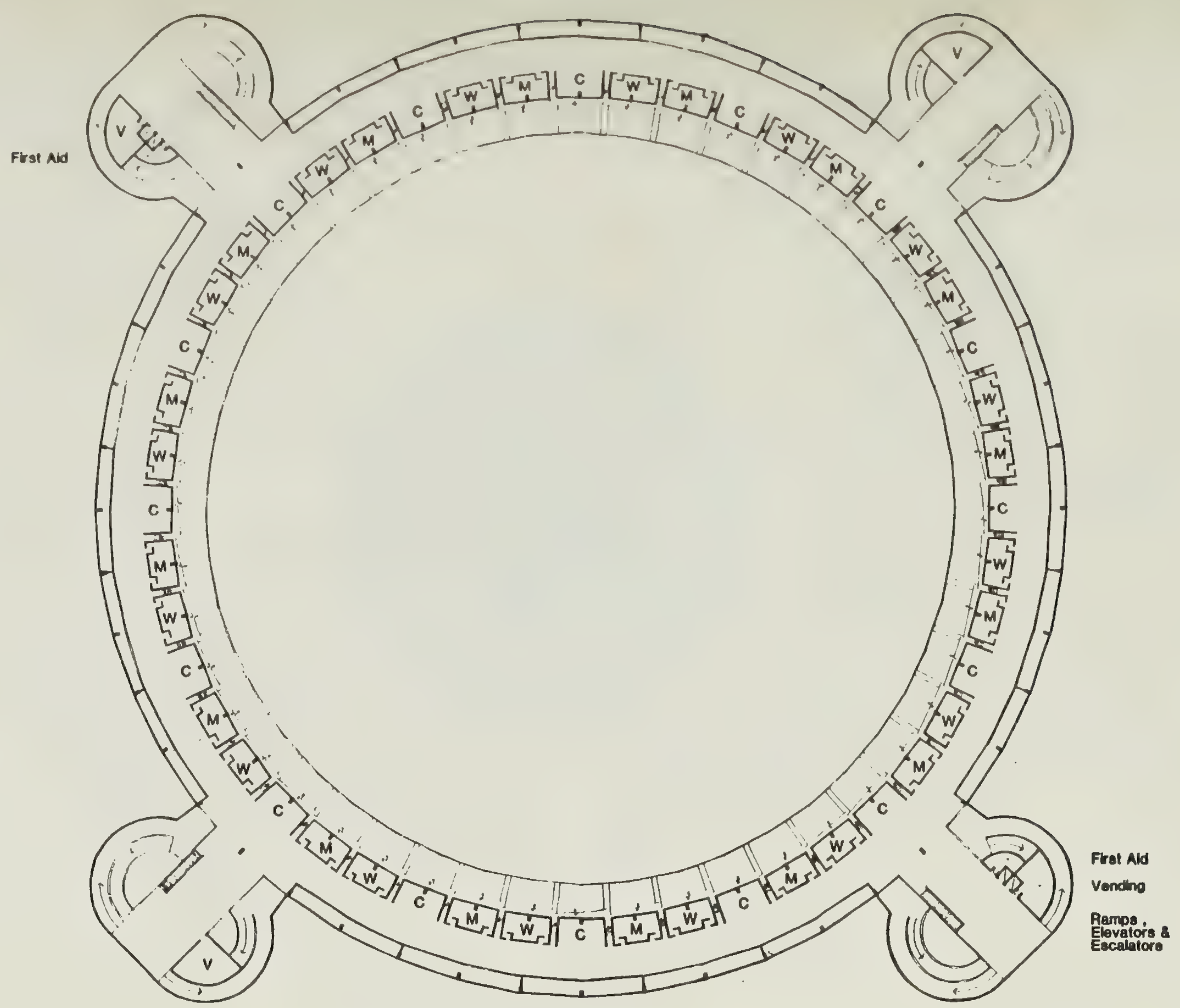
MEZZANINE LEVEL PLAN



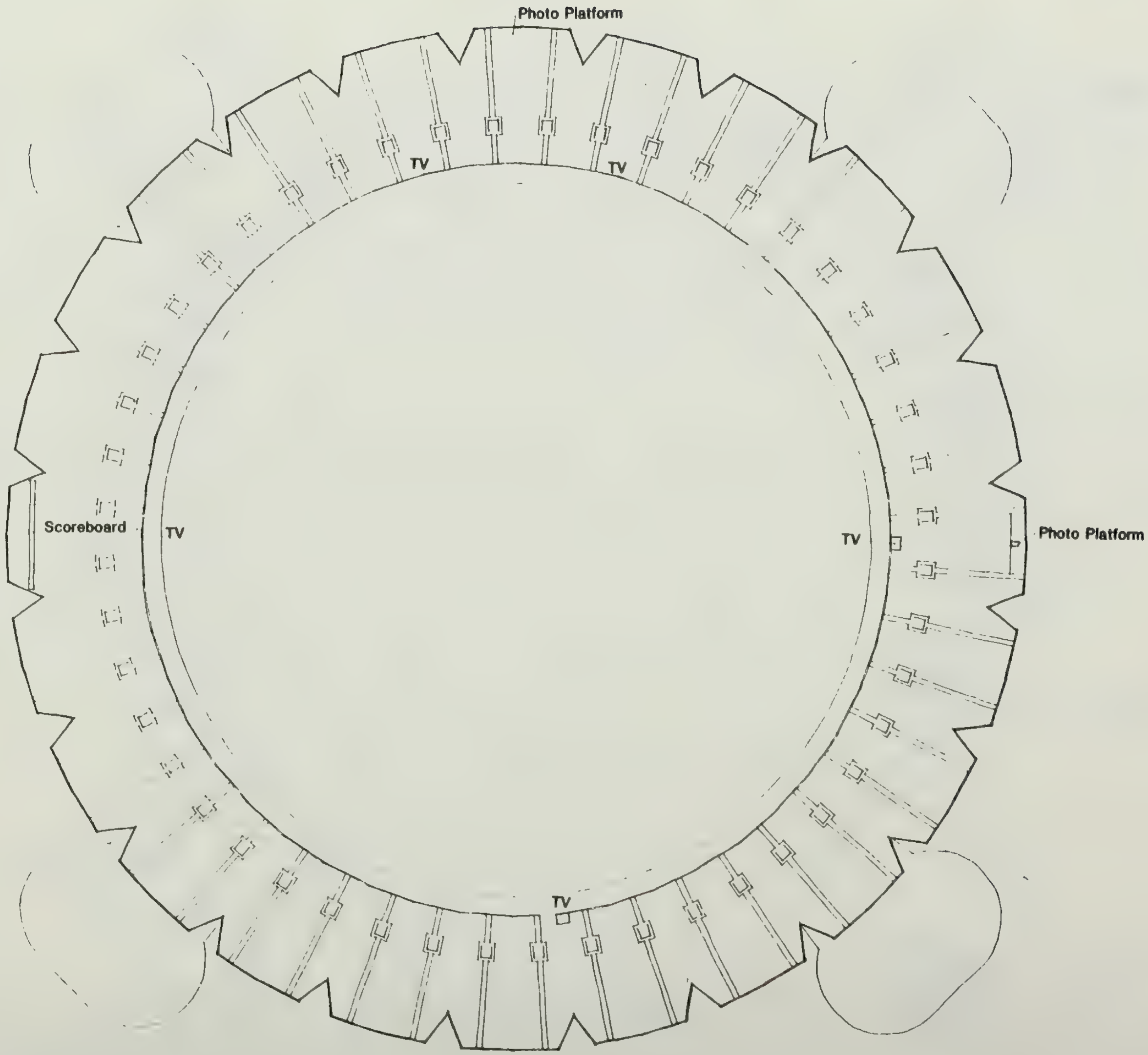
CLUB LEVEL PLAN — BASEBALL SEATING



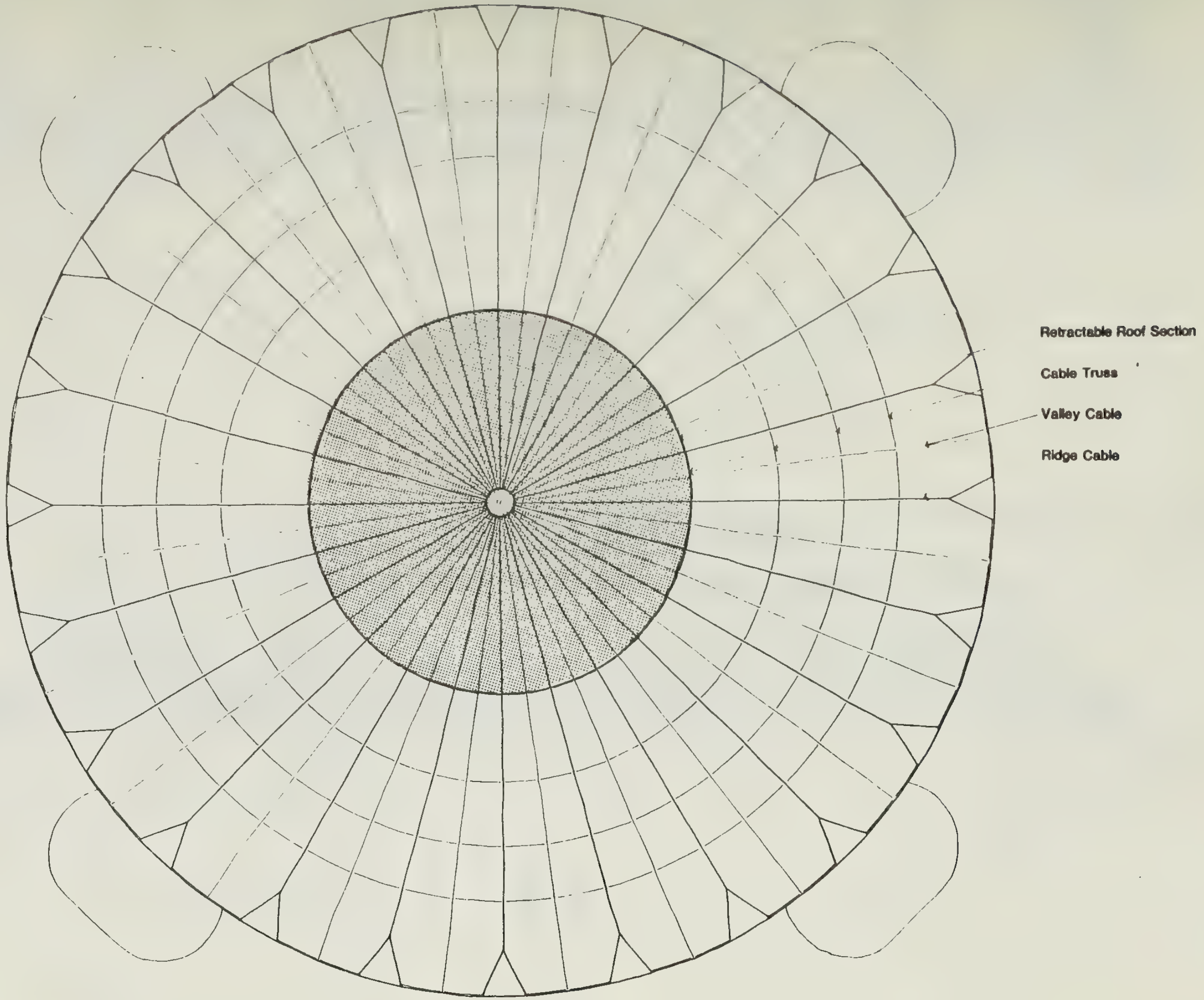
UPPER SUITE LEVEL PLAN — FOOTBALL SEATING



UPPER LEVEL CONCOURSE PLAN

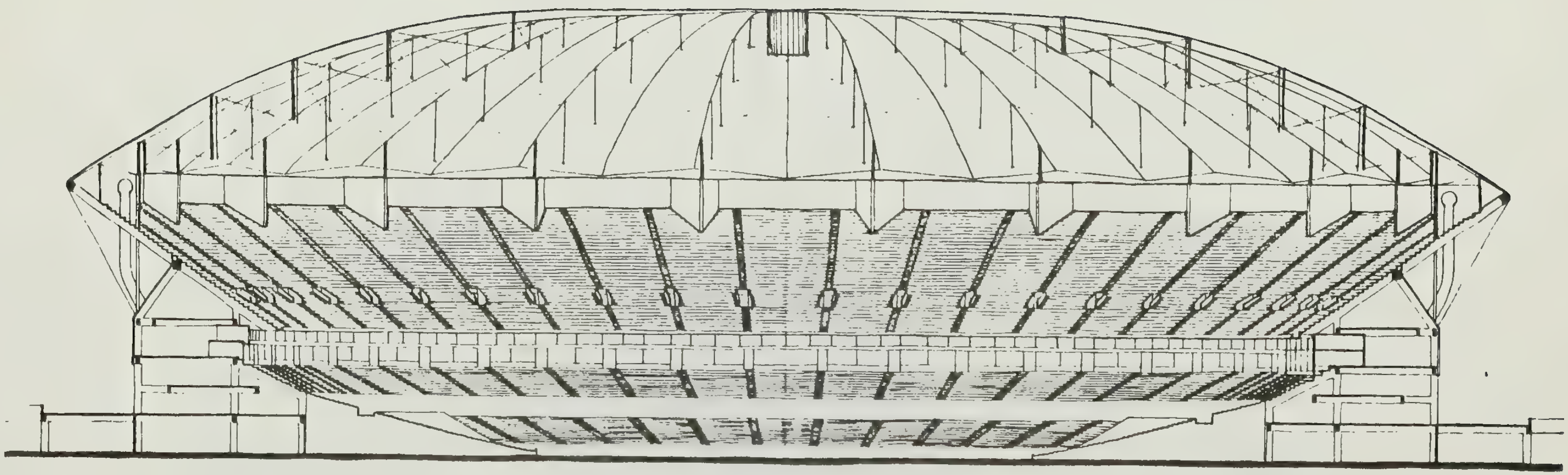


UPPER DECK SEATING PLAN

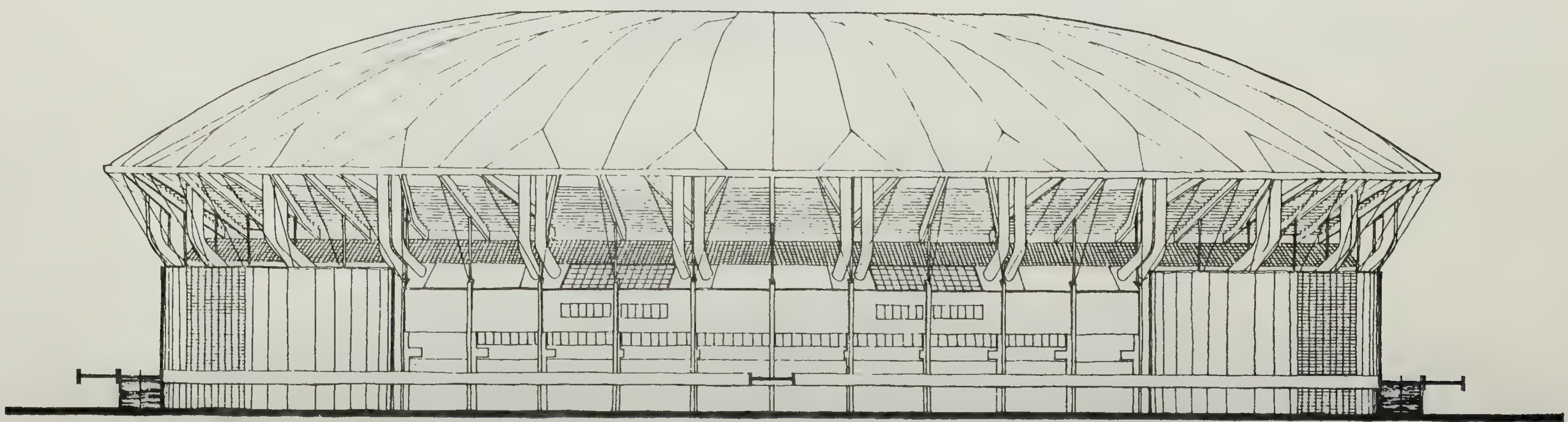


Retractable Roof Section
Cable Truss
Valley Cable
Ridge Cable

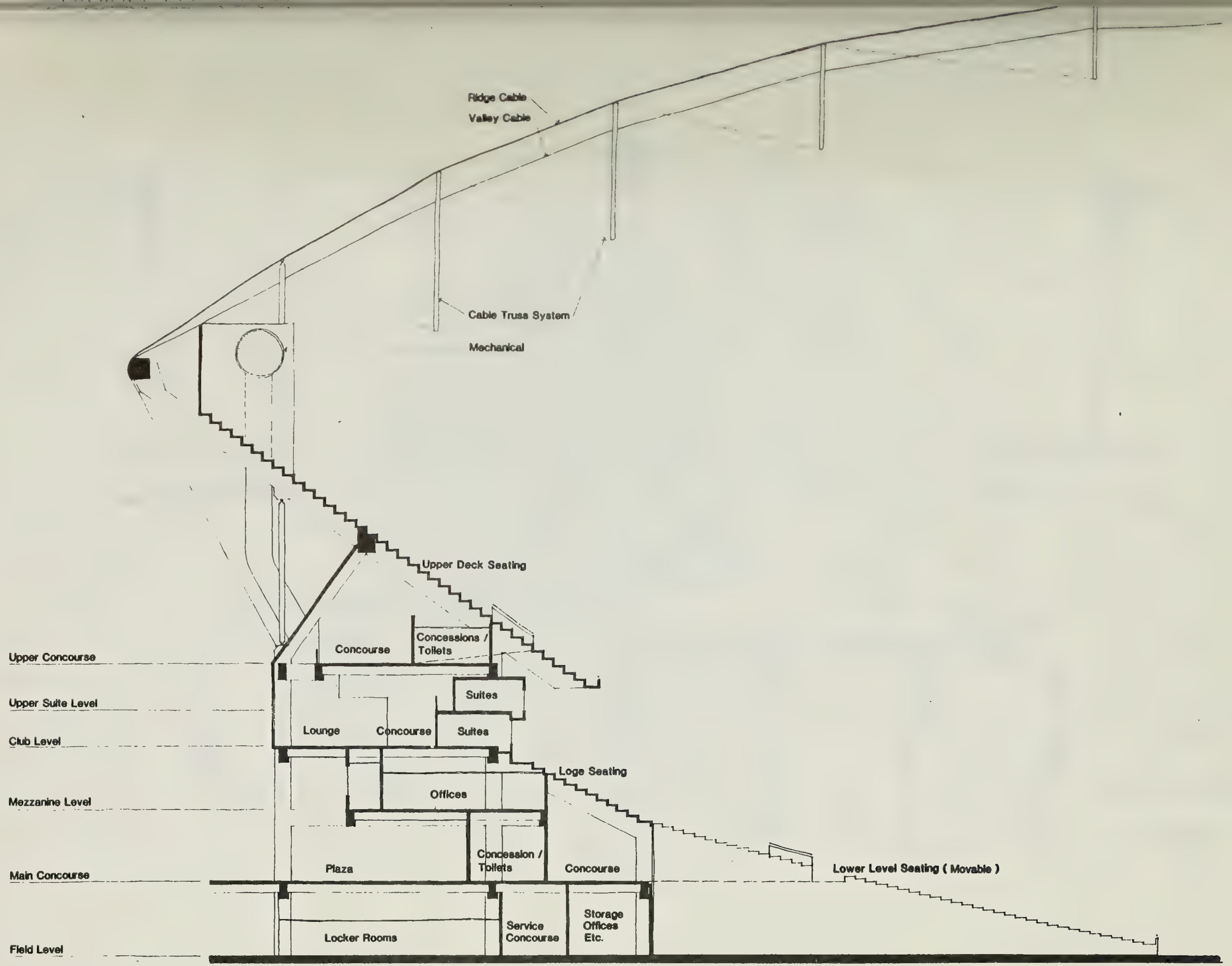
ROOF PLAN



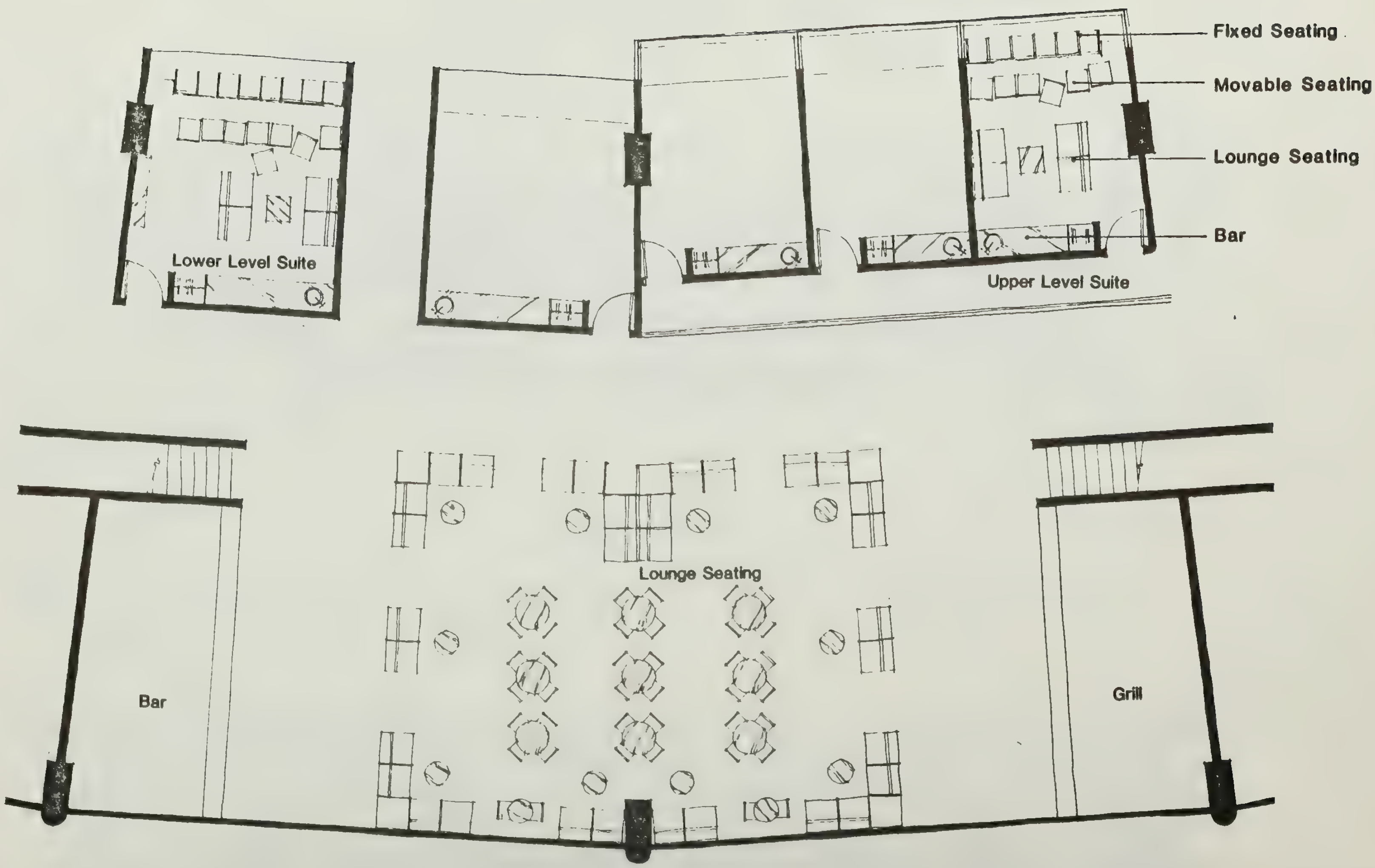
STADIUM SECTION



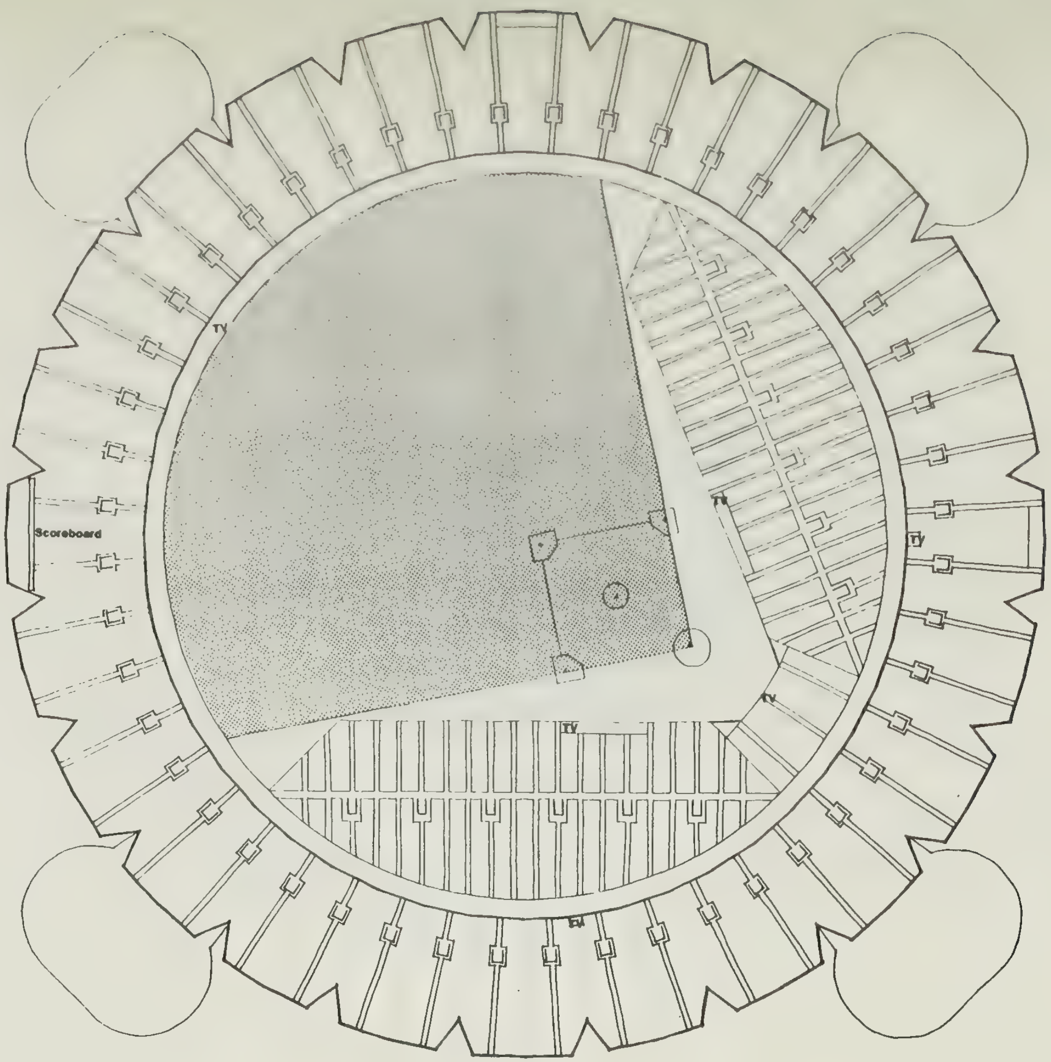
STADIUM ELEVATION



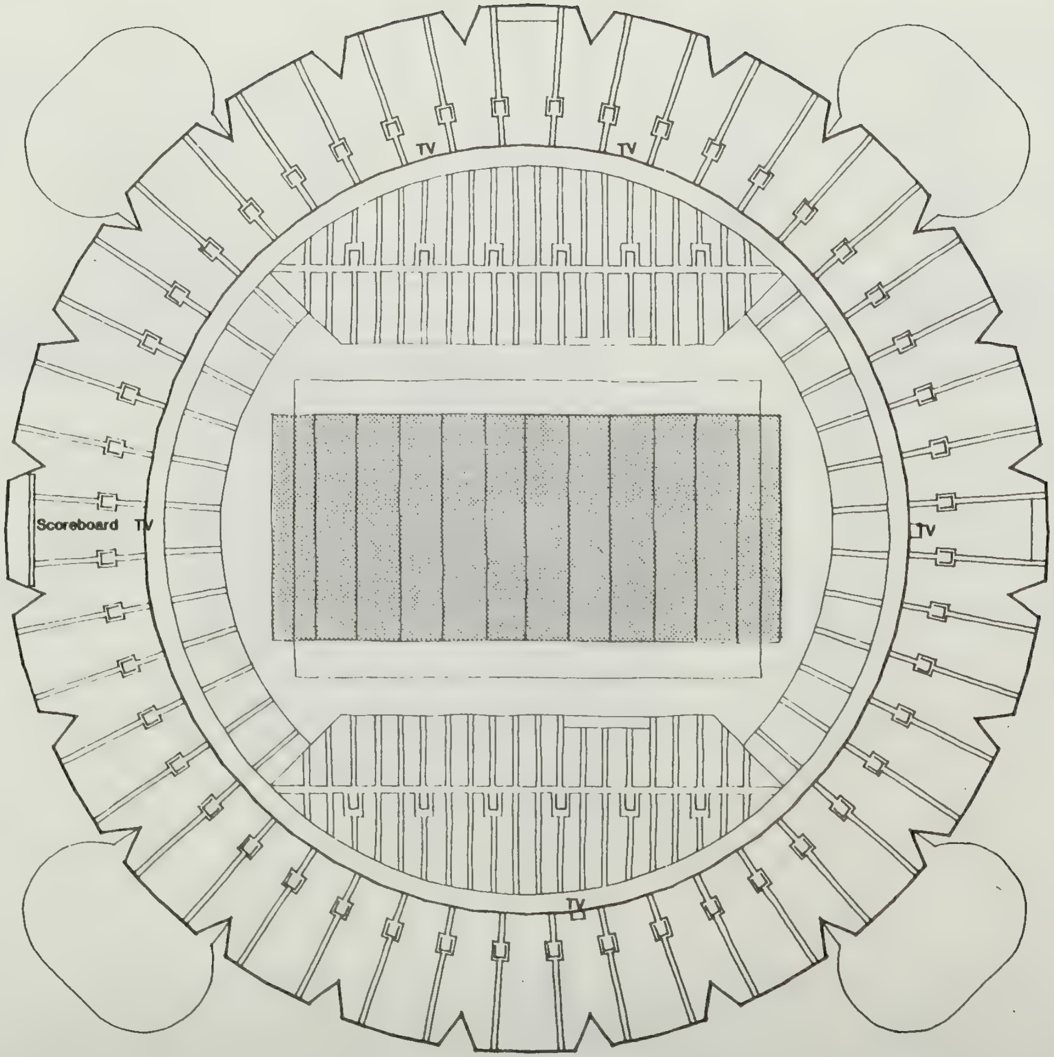
WALL SECTION


Fixed Seating
Movable Seating
Lounge Seating
Bar
Lower Level Suite
Upper Level Suite
Lounge Seating
Bar
Grill

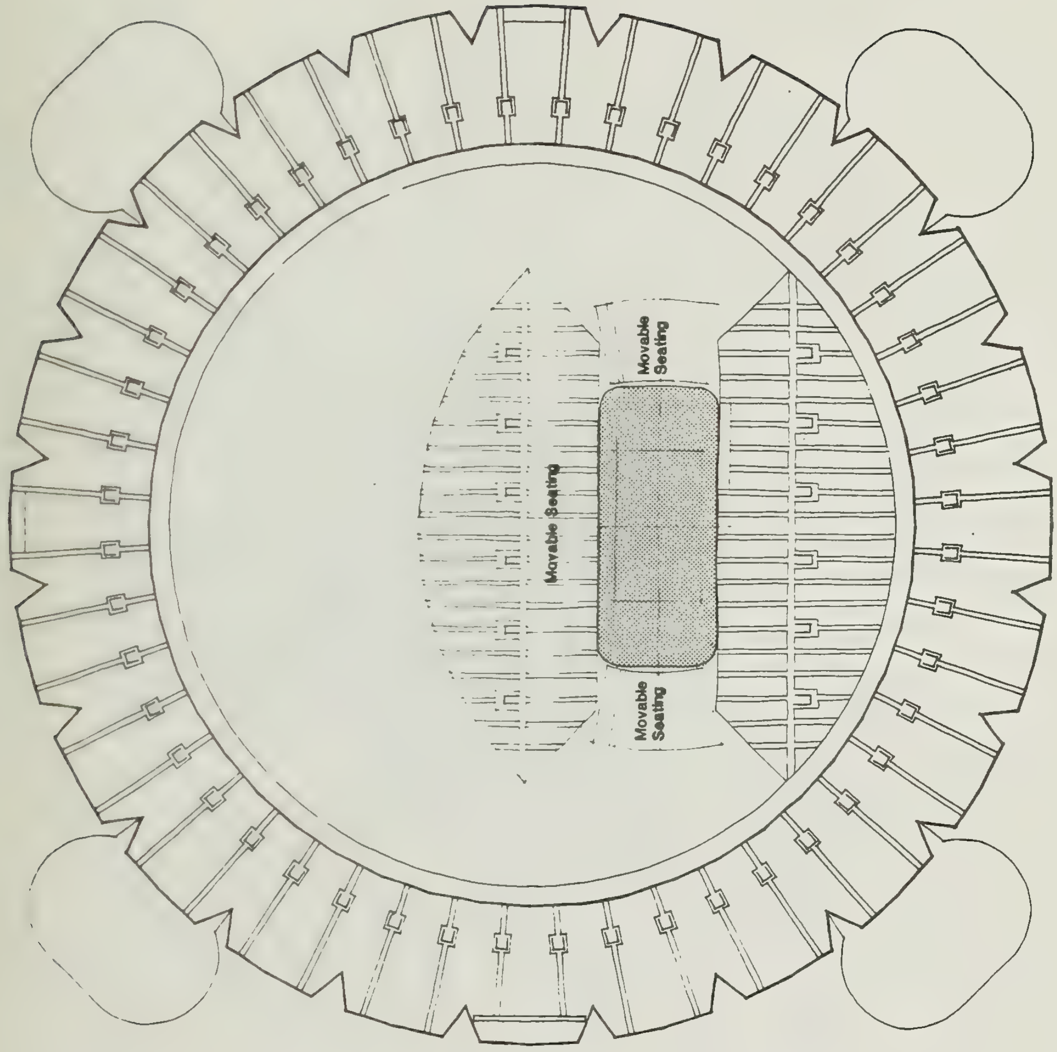
SUITE PLANS



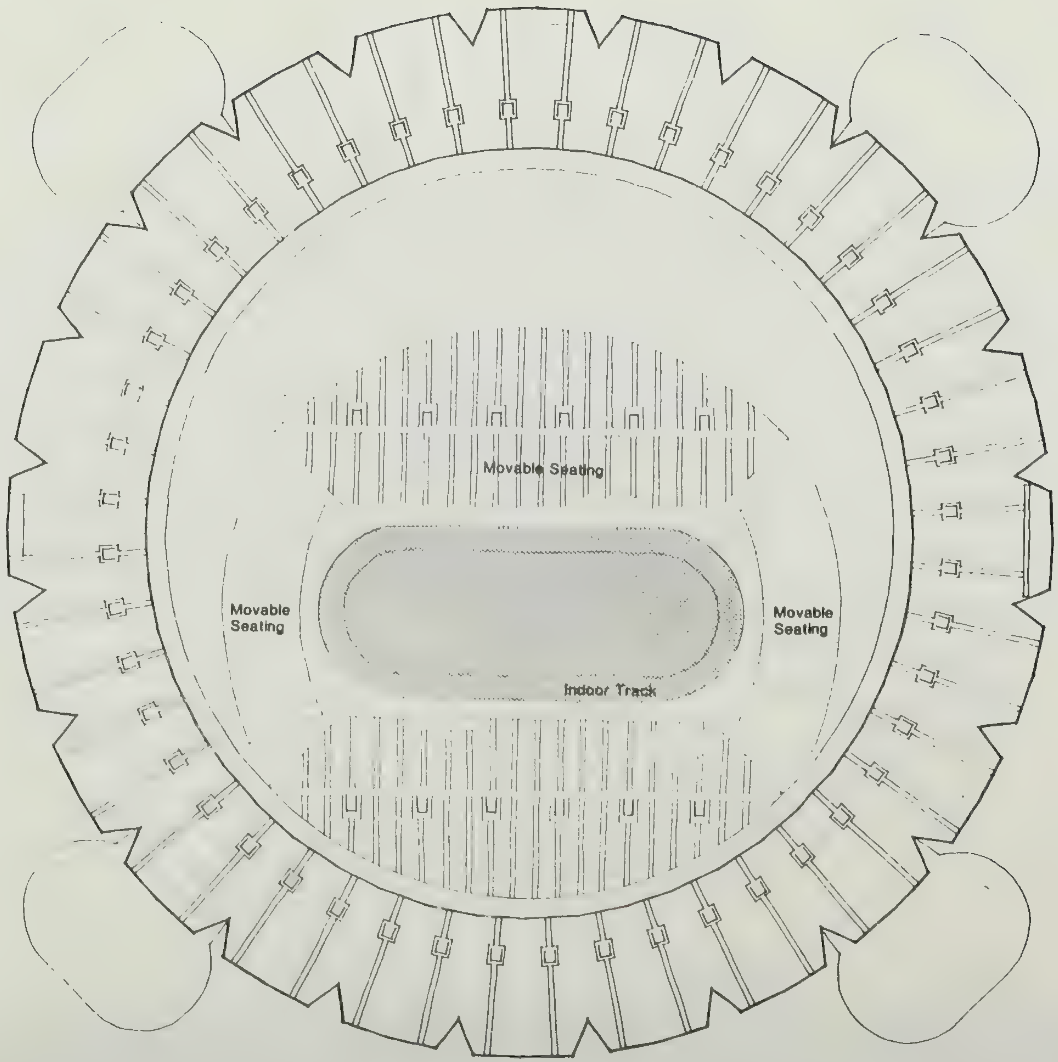
SEATING PLAN — BASEBALL 64,000 seats
(41,000 baseline, 23,000 outfield)



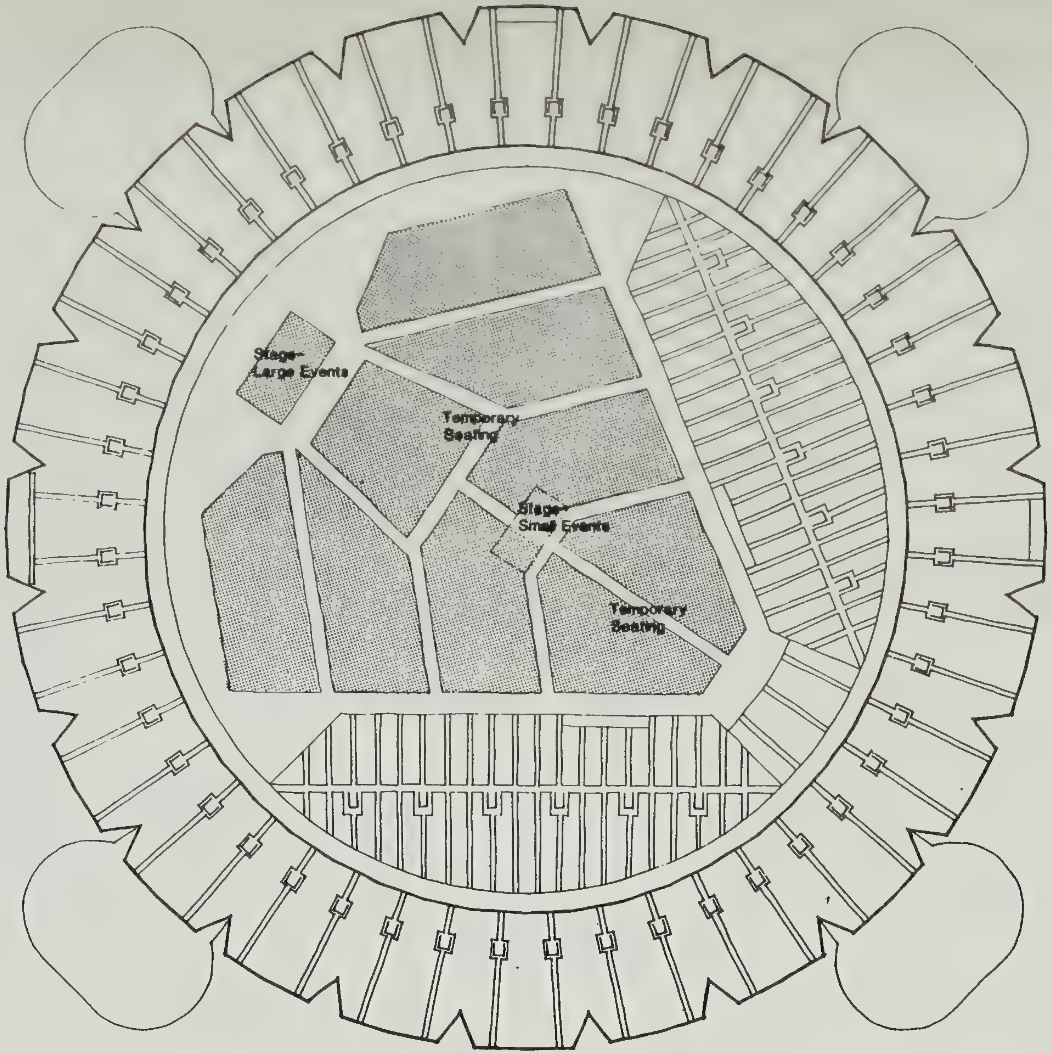
SEATING PLAN — FOOTBALL AND SOCCER 70.250 seats



SEATING PLAN — HOCKEY AND BASKETBALL 20,000 seats



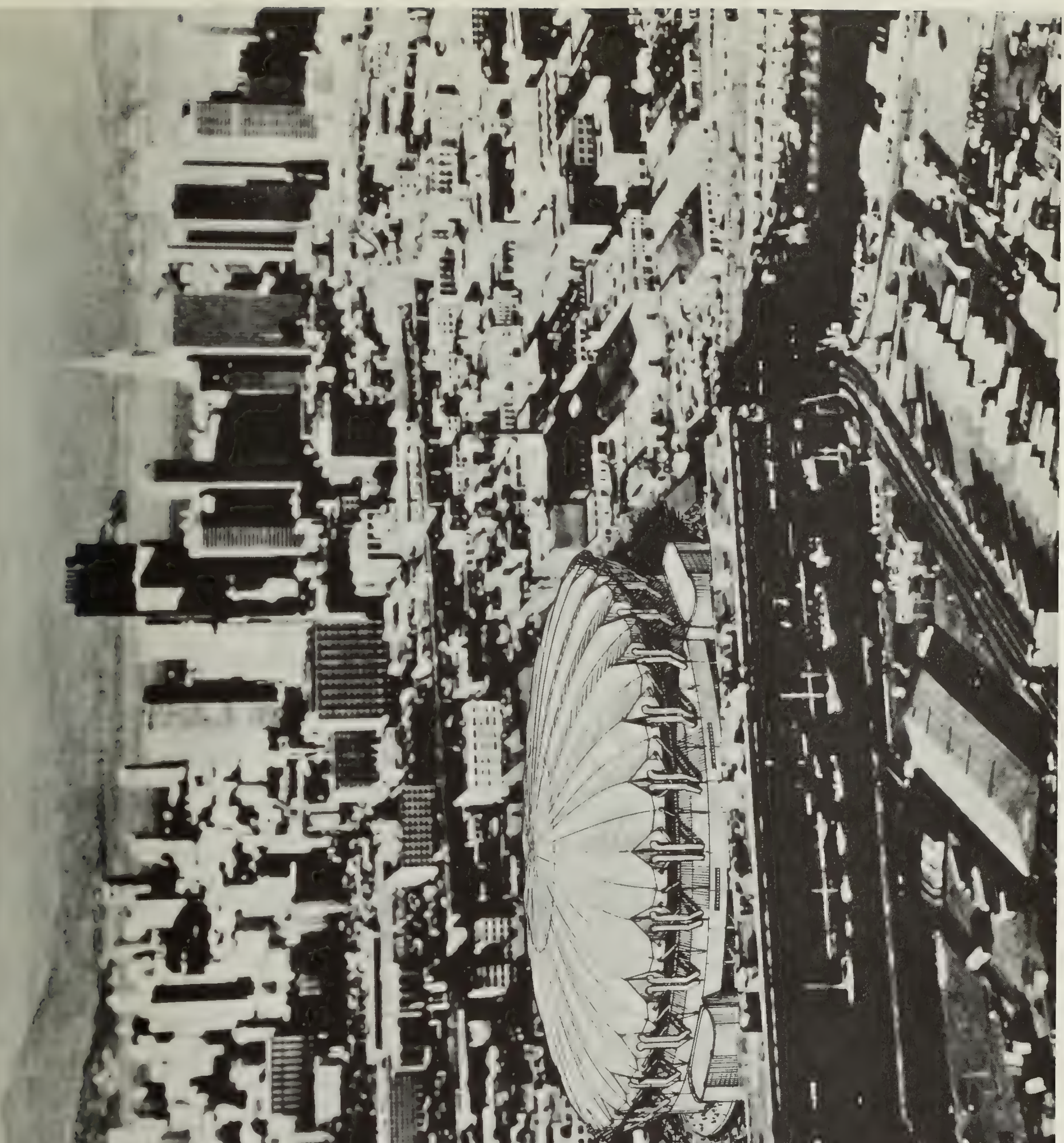
SEATING PLAN — TRACK AND FIELD 22,000 seats



SEATING PLAN — CONCERT AND CONVENTION

Small Events	35,800 seats
Large Events	55,500 seats
In-the Round	83,000 seats

AERIAL PERSPECTIVE



URBAN DESIGN CONSIDERATIONS

Early in this study, it became apparent that the location of a stadium in the China Basin area would require careful and cautious integrated planning with the developers of this area. Similar interfacing would be required with the State, City and private agencies responsible for the intense network of traffic and transportation systems that exist and are planned for this area.

It is also obvious that the concerns, needs and desires of adjacent landowners and developers must be resolved.

The final urban fabric of the China Basin area will not be determined for several years; however, the intense planning that is currently proceeding for sites in this area has given the study team a fair impression of the direction development will take. The assumption that development will be intense is a reasonable one. All indications are that the pattern of renewal and improvement established by the Yerba Buena Redevelopment area will continue to spread south towards China Basin.

The plans for China Basin itself, the South Beach area, the eastern waterfront, the port areas adjacent to China Basin, the Showplace Square area and the smaller pockets of commercial development in the South of Market area are all indicators of the intensity of improvement anticipated for this area. It will become a new "satellite center" in the downtown of San Francisco.

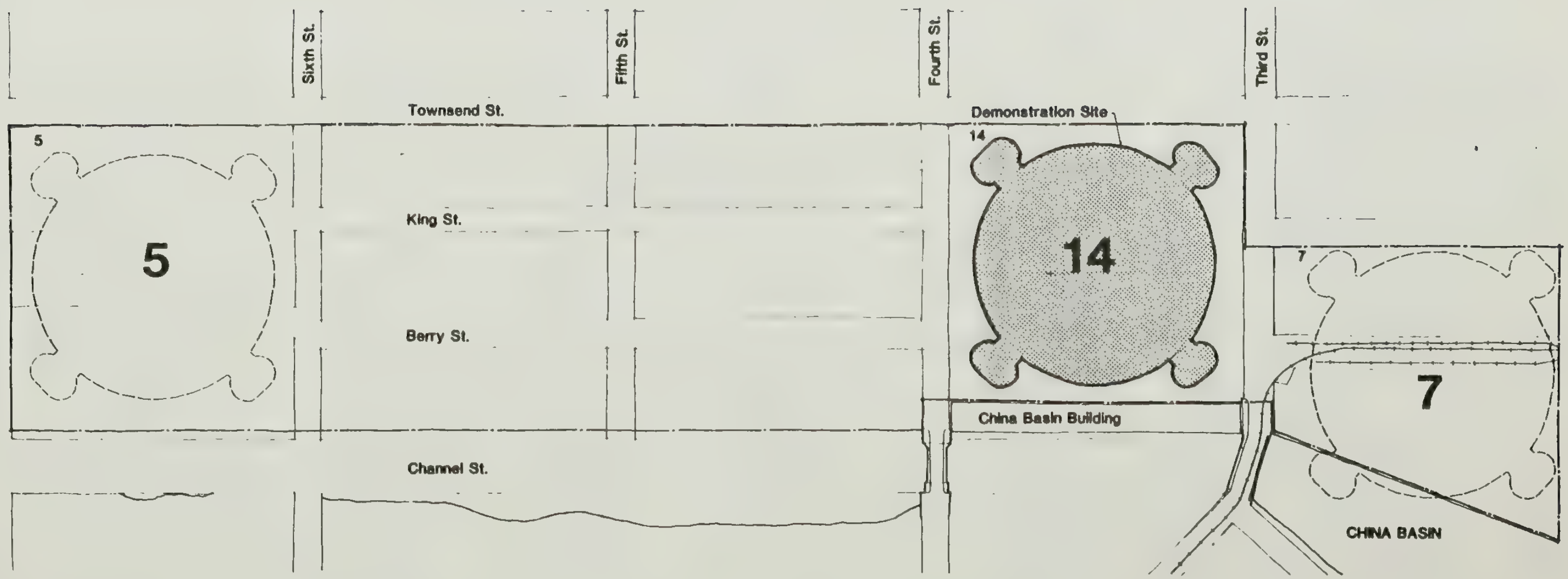
Introducing and integrating a stadium into the planning for this section of the City is occuring at the right time. The opportunity exists to control traffic flow, joint use parking, pedestrian access and to participate in a co-ordinated planning and architectural design process. The City may never have this opportunity again.

The study team has recognized the complexity of planning a stadium in the China Basin area. The list of unknown or unresolved issues of traffic, sewers, property rights, etc., as well as the development of rights of current landowners, makes it difficult to select a specific site area and show specific design solutions. For these reasons, the study team has been asked to show a planning "profile". In order to do this, the team has prepared plans for both ends and the approximate middle of the study area. The level of detail was increased for the center section (the site between 3rd and 4th). This site typifies the range of problems and opportunities that exist in this area. By weaving the street pattern through and around the stadium site, a careful integration of traffic flow is realized. The issues of public and mass transit have been addressed. The opportunities to work with the private sector in creating an integrated urban plan with anchor commercial/office towers at the corners of the site are demonstrated. The architectural massing implications of these possibilities are significant. The anchor

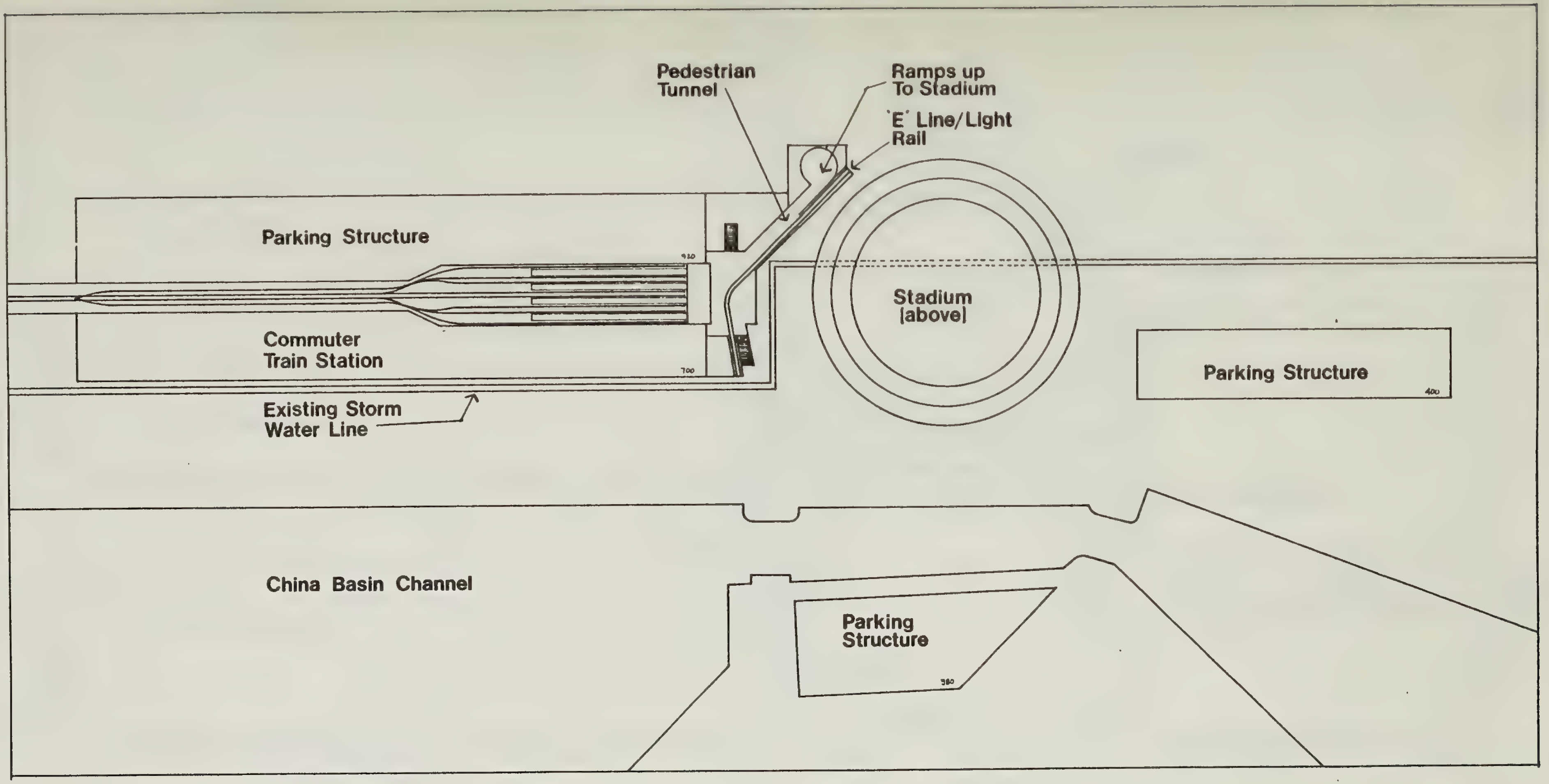
towers could add significantly to the visual texture of the stadium and create an interesting (and exciting) variable pattern.

The demonstration design represented in this report also establishes the opportunities that exist to create new visual interest in the China Basin area while echoing the past and existing waterfront architecture. The bold circular shape of the stadium would be articulated by the boom-like "sail rigging" for the roof structure. The cable support network for the roof, the mechanical stacks and the sail-like roof material are all appropriate visual forms for a waterfront structure. There is an opportunity here to develop an architectural vocabulary capable of recalling the excitement of San Francisco's waterfront in the past and its redeveloped future.

Finally, the proposal to provide a structure with a retractable section of roof (300' in diameter) adds an additional note of interest and change to the urban skyline. The nearly transparent fabric proposed for the roof would allow for a soft, visually changing form that would blend into the cityscape, not impose upon it.

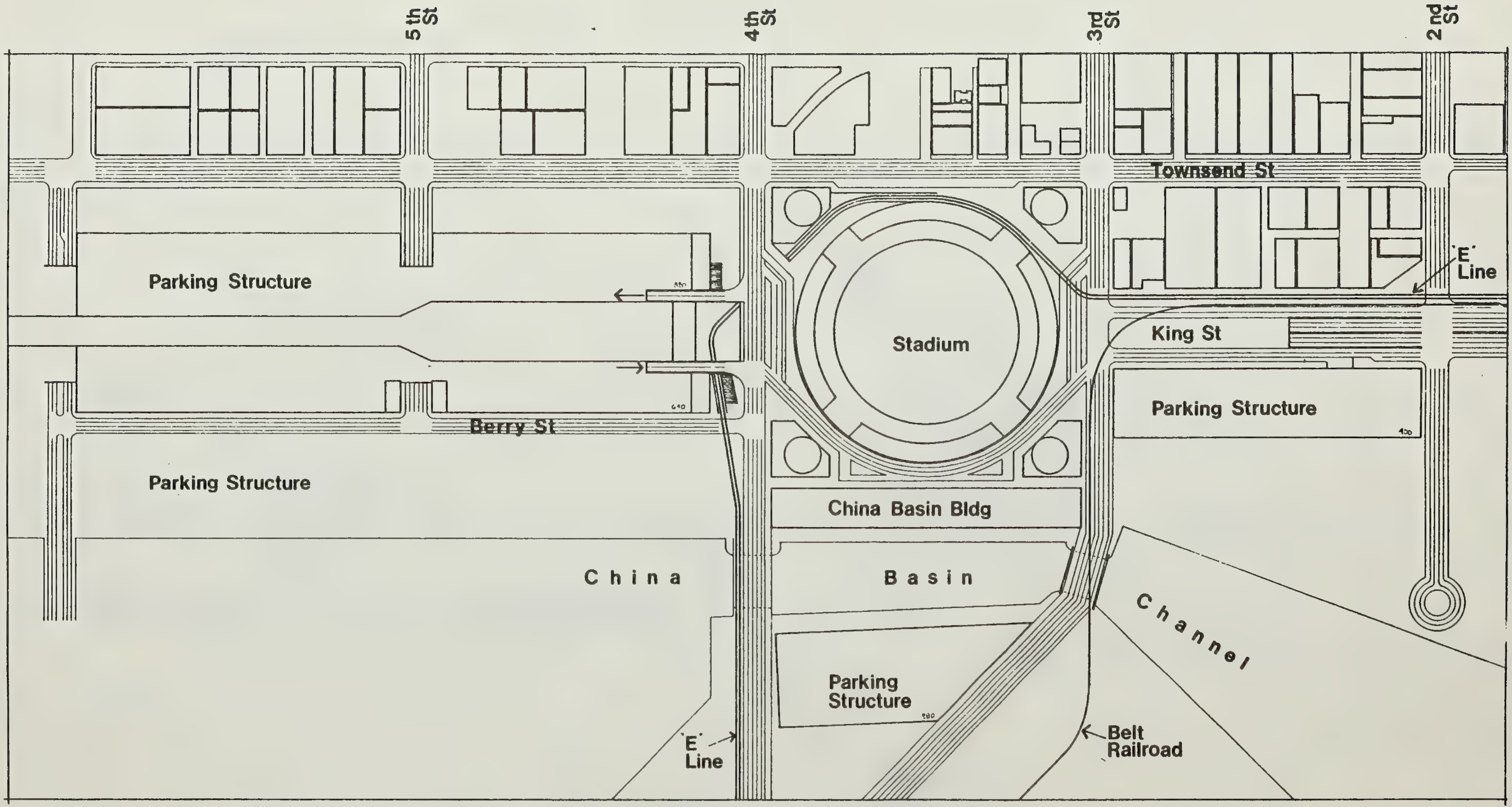


STUDY AREA — SITE PLAN



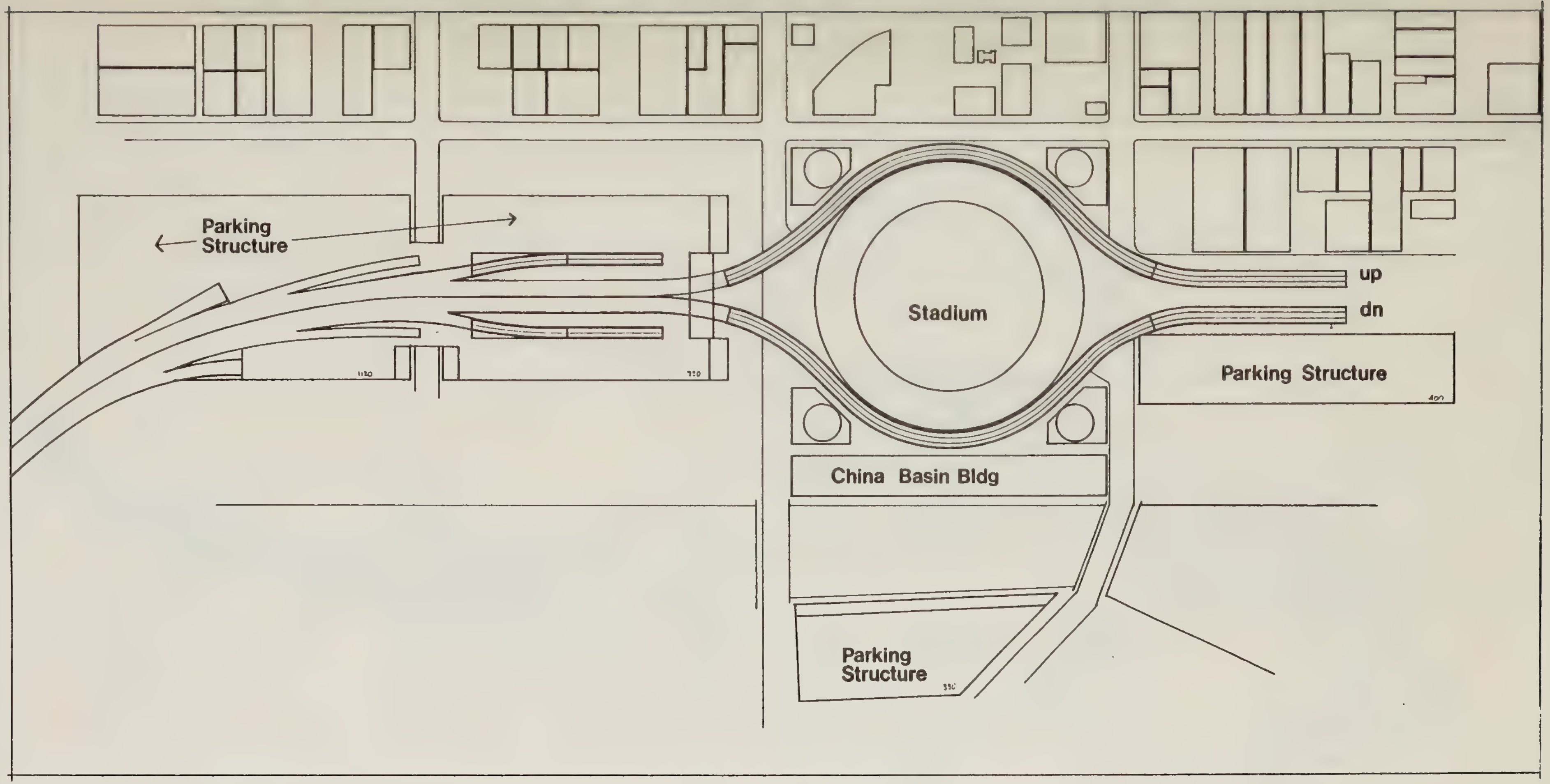
SITE PLAN
SUBTERRANEAN LEVEL (-10'-0")

SITE 14



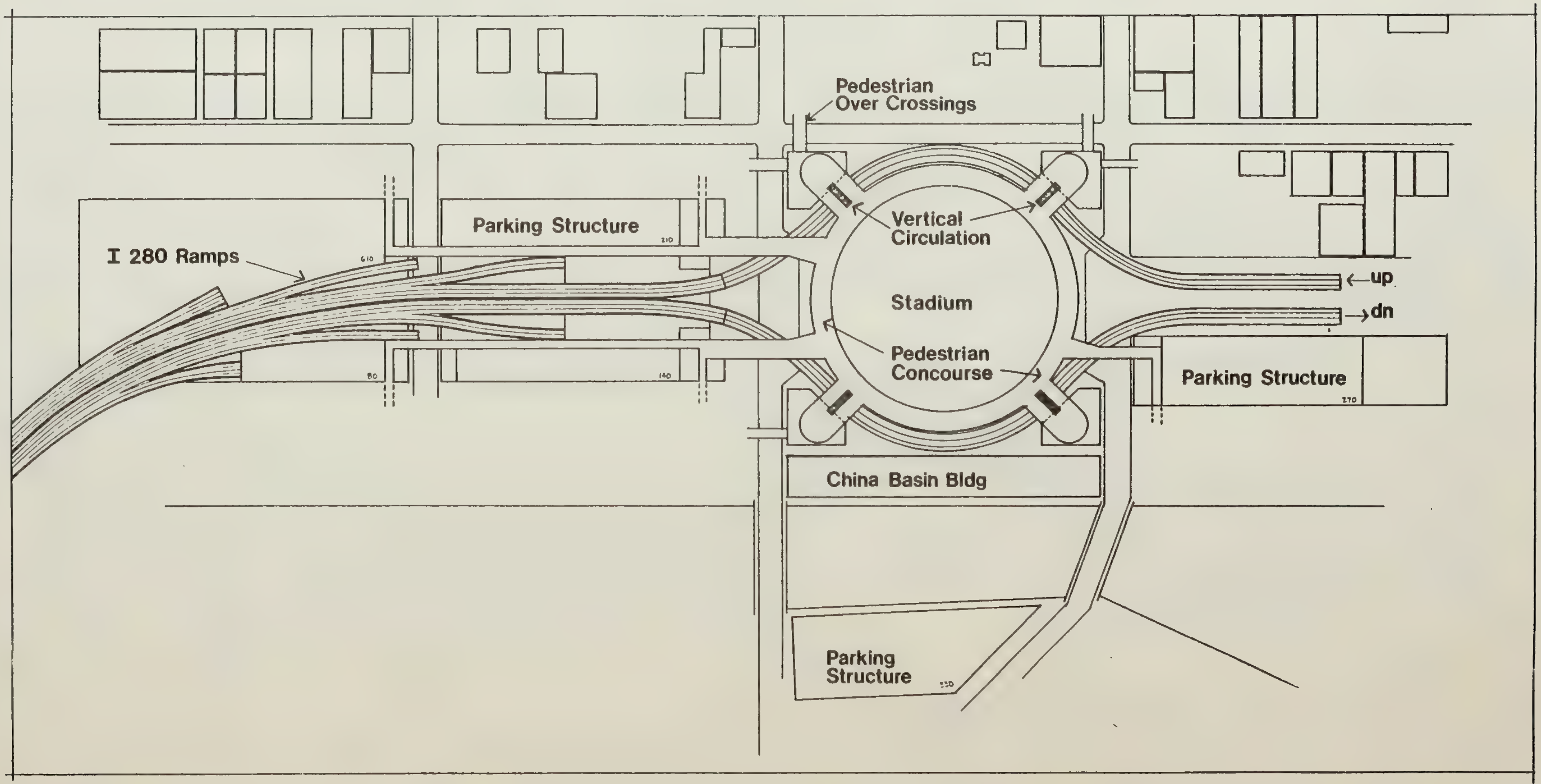
SITE PLAN
GROUND LEVEL

SITE 14



SITE PLAN
ELEVATED (CONNECTOR) STREET LEVEL

SITE 14



SITE PLAN
PEDESTRIAN CONCOURSE LEVEL

SITE 14

3. BUILDING CONSTRUCTION COSTS

3.0 CONSTRUCTION COSTS

A. SCOPE

Barton-Malow and Williams & Burrows, as Joint Venture Construction Managers, have estimated the cost for constructing a new stadium on sites 5, 7, and 14, sited both at grade and depressed. Teflon covered fabric, tension and air-supported roof systems have been evaluated. Estimates include costs for all systems necessary for an operational facility, with the exception of the exclusions listed below:

Exclusions:

1. New scoreboard to be financed by outside sources with cost amortized through advertising revenue.
2. Cost of concessionaires' equipment and furnishings.
3. Utility modifications.
4. Railroad construction.
5. Elevated, ring road construction.
6. Trunk sewer modification.
7. Surface street modifications.

B. DATA

Barton-Malow and Williams & Burrows used the following data, assumptions, and documentation to prepare the estimate of cost.

1. Conceptual drawings provided by HNTB, CTMA, & Geiger-Berger.
2. Observations from onsite inspection.
3. The experience of Barton-Malow (10 year stadium/arena experience) and Williams & Burrows (50 year Bay Area Construction/Candlestick Park experience).
4. Data from other Study Team members.
5. All costs are based upon May, 1983 prices. Lee Saylor, Inc., estimates current escalation to be 3% per annum for 1983 and 7% to 9% per annum for 1984. Estimates do not include escalation.
6. The quality is comparable to stadium projects in which the Study Team has been directly involved in the recent past.

C. ALTERNATIVES

1. Alternate No. 1 is a facility constructed with the playing surface elevation nominally equal to surrounding surface grade, with a tensioned cable supported, teflon coated fabric roof.

2. Alternate No. 2 is a facility constructed with the playing surface nominally equal to surrounding surface grade, with an air-supported, teflon coated fabric roof.

3. Alternate No. 3 is a facility constructed with the playing surface elevation depressed below surrounding surface grade, with a tensioned cable supported, teflon coated fabric roof.

4. Alternate No. 4 is a facility constructed with the playing surface depressed below surrounding surface grade, with an air-supported, teflon coated fabric roof.

D. ANALYSIS

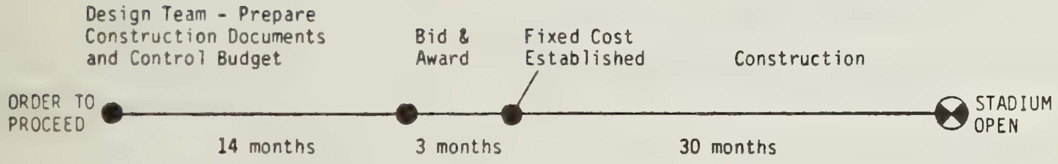
1.0 Cost Estimate

Based upon the current conceptual drawings produced by the Study Team, we estimate facility costs for the various Alternates (all for site no. 14) to be as follows:

Alternate No. 1	$105.5 million
Alternate No. 2	$101.3 million
Alternate No. 3	$106.1 million
Alternate No. 4	$101.9 million

2.0 Schedule

A design/bid/build sequence of activities would dictate a 47 month schedule. This time would be allocated as shown below:



E. **ELECTRICAL WORK DESCRIPTION**
NEW DOWNTOWN STADIUM

The electrical budget includes the following principal systems:

1. Primary Power Distribution System
2. Secondary Power Distribution System
3. Emergency Power Distribution System
4. Motor Starters and Connections
5. Field Lighting System
6. Building Lighting System
7. Telephone Raceway System
8. P.A. Sound System
9. Security System
10. Lightning Protection
11. T.V. Cable Tray System
12. Fire Alarm System
13. Score Board Power Supplies
14. Temporary Lighting and Power System
15. Building Perimeter Lighting

E. **MECHANICAL WORK DESCRIPTION**
NEW STADIUM

I. Plumbing:

1. Plumbing fixture per code.

2. Domestic cold water feed from two sides.

3. Domestic Cold water only distributed to all areas. If required by local code hot water will be generated by electic heaters locally. Locker rooms will be supplied hot water from main equipment served by gas fired heaters.

4. Outside storm water system per local code.,

5. Rough-in only to concessions

6. Rough-in only to private boxes.

II. Heating Ventilating and Air Conditioning:

1. Twenty-four built up fan systems located internally.

2. Duct systems generally designed as shown on plans.

3. A two pipe system serves all fan systems.

4. Three air cooled chillers (1000 tons total) are piped into the two pipe systems.

5. Boiler capacity gas and oil fired to provide approximately 25,000,000 BTU/HR.

6. Heating and ventilating systems for all lower level areas except those reserve for home teams.

7. A ventilating scheme for moving air off of the playing field level.

8. A central panel for control of all major fan and cooler systems.

III. Fire Protection:

1. A valved standpipe system serving all levels.

F.

BUDGET ESTIMATE FOR NEW DOWNTOWN STADIUM - SITE 14 DEPRESSED, TENSION ROOF (ALTERNATE NO. 3)

DESCRIPTION	BUDGET
- Excavation, Backfill & Drainage	$ 2,509,709
- Pipe Piles, Con. Filled	718,820
- Sheet Piling	2,638,000
- Pile Caps	652,800
- 8" Concrete Paving	671,000
- Concrete	21,844,365
- Precast Concrete	5,795,080
- Masonry	3,343,000
- Structural Steel	1,730,000
- Metal Decking	-0-
- Miscellaneous Iron	1,500,000
- Carpentry	490,000
- Water and Dampproofing	200,000
- Insulation	50,000
- Insulated Metal Siding	3,285,000
- Roofing & Sheet Metal	232,000
- Sealants	132,000
- Hol. Metal Doors & Frames	110,000
- O.H. Doors & Shutters	85,000
- Revolving Doors	-0-
- Entrance Balance Doors	100,800
- Glass @ Suites Sloped Glazing	491,000
- Curtain Walls	1,586,000
- Luminous Panels @ Ext. Wall	1,620,000
- Finish Hardware	100,000
- Mirrors	25,000
- Drywall & Plaster	1,082,000
- Ceramic Tile	50,000
- Acoustical Treatment	25,000
- Synthetic Field Turf	1,432,000
- Resilient Floors & Base	15,000
- Carpeting	-0-
- Painting	500,000
- Toilet Partitions & Screens	125,000
- Graphics	250,000
- Pedestrian Turnstiles	100,000
- Lockers - Players	80,000
- Lockers - Miscellaneous	50,000
- Telephone Booths	-0-
- Toilet Room Accessories	50,000
- Field Sports Equipment	15,000
- Dock Bumpers	2,500
- Flagpoles	40,000
- Ticket Bus Gates	-0-
- Ticket Booths	40,000
- Attendant Booths	-0-

F.

BUDGET ESTIMATE FOR
NEW DOWNTOWN STADIUM - SITE # 14
DEPRESSED, TENSION ROOF
(ALTERNATE NO. 3)

DESCRIPTION	BUDGET
- Retractable Seating	4,250,000
- Armchair Seat/Benches	3,675,000
- Fabric Roof W/Cables	12,300,000
- Elevators	570,000
- Escalators	1,500,000
- Mechanical - Fire Protection	10,250,000
- Electrical - Soundsystem	6,967,000
- Scoreboards	N/A
- Sitework	-
- Landscaping Trees/Grates	200,000
- Site Excavation & Backfill	20,000
- Site Utilities -	75,000
- Asphalt - Parking Lots	-0-
- Site Concrete	160,000
- Railing, Bollards, Etc.	50,000
Subtotal	93,783,074
Contingency 7%	6,564,815
Subtotal	100,347,885
General Conditions 5 3/4%	5,770,000
Total	106,118,000 *

* Budgeted Construction Administration Fee Not Included

BUDGET ESTIMATE FOR
NEW DOWNTOWN STADIUM - SITE # 14
AT GRADE, TENSION ROOF
(ALTERNATE No. 1)

DESCRIPTION	TOTAL
- Excavation & Backfill	1,146,712
- Pipe Piles, Concrete Filled	1,427,840
- Sheet Piling	-0-
- Pile Caps	-0-
- 8" Concrete Paving @ Field	671,000
- Concrete	22,809,237
- Pre-cast Concrete	6,343,580
- Masonry	3,797,000
- Structural Steel	1,730,000
- Metal Decking	-0-
- Misc. Iron	1,500,000
- Carpentry	510,000
- Water & Dampproofing	10,000
- Insulation	60,000
- Insulated Metal Siding	4,208,630
- Roofing & Sheet Metal	232,000
- Sealants	152,000
- Hol. Metal Doors & Frames	130,000
- O.H. Doors & Shutters	85,000
- Revolving Doors	-0-
- Pressure Balances Doors	100,800
- Glass @ Suites	491,000
- Curtain Wall W/Sloped Glazing	1,586,000
- Luminous Panels	1,620,000
- Finish Hardware	120,000
- Mirrors	25,000
- Drywall & Plaster	1,082,000
- Ceramic Tile	50,000
- Acoustical	25,000
- Synthetic Field Turf	1,432,000
- Resilient Flooring	15,000
- Carpeting	-0-
- Painting	550,000
- Toilet Partitions & Screens	125,000
- Graphics	250,000
- Pedestrian Turnstiles	100,000
- Lockers - Players	80,000
- Lockers - Miscellaneous	50,000
- Telephone Booths	-0-
- Toilet Room Accessories	50,000
- Field Sports Equipment	15,000
- Dock Bumpers	2,500
- Flagpoles	40,000
- Ticket-Bus. Gates	-0-
- Ticket Booths	40,000
- Attendant Booths	-0-

F.

BUDGET ESTIMATE FOR
NEW DOWNTOWN STADIUM - SITE # 14
AT GRADE, TENSION ROOF
(ALTERNATE NO. 1)

DESCRIPTION	TOTAL
- Retractable Seating	4,250,000
- Armchair Seats/Benches	3,675,000
- Fabric Roof W/Cables	12,300,000
- Elevators	630,000
- Escalators	2,000,000
- Mechanical - Fire Protection	10,250,000
- Electrical - Sound System	6,967,000
- Scoreboard	N/A
- Site Work	-0-
- Landscaping - Trees, Grates	200,000
- Excavating & Backfill	20,000
- Utilities	75,000
- Asphalt	-0-
- Concrete	160,000
- Railings, Bollards, Etc.	50,000
Subtotal	93,239,299
Contingency 7%	6,526,751
Subtotal	99,766,050
General Conditions 5 3/4%	5,736,548
Total	105,502,598 *

* Budgeted Construction Administration Fee Not Included.

F. CONSTRUCTION COSTS (All costs shown in $ millions)

	CANDLESTICK PARK				NEW DOWNTOWN STADIUM		
	Scheme 5	Scheme 6	Scheme 7	Scheme 8	Site 5	Site 7	Site 14
Candlestick Park Alt. 1 Air Supported Structure			$57.1	$57.1			
Candlestick Park Alt. 2 Barton-Malow Scheme of 12/18/81			$60.4	$60.4			
Candlestick Park Alt. 3 New Stadium at Grade Air Supported Structure	$109.6	$109.6					
Candlestick Alt. 4 New Stadium Tension Structure	$113.3	$113.3					
New Dtn. Stadium Alt. 1 at Grade Tension Structure					$110.8	$110.8	$105.5
New Dtn. Stadium Alt. 2 at Grade Air Supported Structure					$107.1	$106.1	$101.3
New Dtn. Stadium Alt. 3 Depressed Tension Structure							$106.1
New Dtn. Stadium Alt. 4 Depressed Air Supported Structure							$101.9

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COST ESTIMATE REVIEW AND ANALYSIS

OBJECTIVE:

To review and analyze cost estimates prepared by Williams and Burrows and Barton Malow for alternative schemes and studies concerning the Sports Stadium for City of San Francisco. The purpose of the review was to assess the unit costs used in these estimates for their reasonableness, consistency and authenticity.

PROCEDURES:

The procedures followed were:

1. Review the unit costs used in relationship to the quantities shown.
2. Check the quantities against the drawings for those items where the quantities would be large enough to have a significant impact on the total cost.
3. Check the estimates for continuity of price and quantity. For example:
    a) Metal deck quantity to concrete fill
    b) Foundation excavation to foundation concrete
    c) The same prices for the same work
4. Check quantities and ratios.
    a) Lbs. rebar to CY concrete
    b) Lbs. steel to sq. ft. of surface area
    c) Cu. yds. concrete to sq. ft. of surface area
5. Check composite costs for their relationship to established parameters.
6. Prepare schedule of questionable items for review by the study team.

COST ESTIMATE REVIEW AND ANALYSIS - Cont'd

7. Check estimates and plans for omissions to be sure that in the course of summarizing and quantifying the various alternates, that a significant work item was not overlooked.

In the preparation of the variance schedule those items that met the criteria of reasonableness were not listed although they had been reviewed in the manner described in the Procedure Section. Also, those items that were questioned, but the variance value was not significant, were not scheduled. It was decided that for the purpose of this review, only variance values above $15,000 would be scheduled.

Since the questioned items occur in more than one estimate, it was felt that scheduling each estimate independently would be redundant. It was decided that the questionable items occurring in the basic estimates (Alt. #1 Candlestick and Alt. #1 Downtown Stadium) would be adequate and that all other estimates could be adjusted from these items.

Exhibit "A" is a Revised Construction Cost Summary reflecting the variances recommended.

Estimate - Barton-Malow/Alternate 2 - Candlestick was not supported by worksheets to review. This total was not revised.

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ESCALATION

The assumption throughout the review was that all costs on the estimate were current and no provisions were included for escalation.

Although it is felt that it will not be in the 11 to 12 percent range that was experienced in 1979, 1980 and 1981, inflation will be experienced in each of the coming years. The unstable nature of the present economy and the uncertainty of the future years makes the projection of building cost escalation very difficult. Following is our projection for the upcoming years:

If project commences:

6/1/84 Add 5.3% to Project Cost

6/1/85 Add 12.3% to Project Cost

6/1/86 Add 19.3% to Project Cost

6/1/87 Add 26.3% to Project Cost

EXHIBIT "C"

5/10/83
Page 1
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SPORTS STADIUM STUDY
LSI #8329n
STADIUM AT GRADE: Barton - Malow

PAGE #	ITEM #	DESCRIPTION	PRICE SHOWN	LSI PRICE	DIFFERENCE	VARIANCE SCHEDULE
W1	#4	Foundations *Note: Concrete filled piles, excavation and backfill.	300	150	927,000	Average found price for work of this nature rarely exceeds $150 per CY.
W1	#5&6	S.O.G. Concrete	200	130	416,150	Converting the costs to SF works out to 4.96 SF for B/M where very conservative cost would be closer to $3.25 psf in the S.F. market.
W2	#1	Concrete Columns P.I.P.	600	400	336,000	For the quantity involved quotes received for this type of work has not exceeded 383.00CY in any instance - unit cost too high.
W6	#1	Bridge Over Truck Ramp	540	300	73,500	Conventional poured in place structural slab 12" thick rarely costs more than $300 per CY.
W8	#2	Structural Steel	1,500	1,100	257,200	Structural steel framing in S.F. area is currently bidding at 900.00 to 1100.00 ton.
W8	#3	Roofing	4.00	1.50	144,720	Price too high for this type of installation.
W9	#5	Sloped Glazing	60.00	32.50	479,160	Price too high for this work. Sloped glazing usually adds 30% to standard prices.
W9	#6	Translucent Panels	45.00	20.00	899,725	Quotes obtained from curtain wall supplier indicates that translucent panels cost no more than metal panels.
					$3,533,455.00	

4. TRAFFIC/TRANSPORTATION/PARKING

A. SCOPE

The objective of this task is to determine how the transportation system will be affected by a stadium in the proposed development area. For each of the alternative stadium sites, the following tasks were completed:

- o Determination of how alternative amounts of parking, availability of proposed transit improvements, and new stadium location in general will affect modal split and origin/destination assumptions.
- o Identification of traffic/transit resources and problems, including roadway capacities, available parking supply (existing and future), and existing and proposed transit improvements.
- o Development of alternative parking/transit supply scenarios and estimates of parking spaces, traffic capacity, and transit seats needed for stadium events.
- o Identification of needed transit, traffic and parking improvements, and estimated costs.

B. DATA

The data used in the analysis of downtown stadium alternatives was obtained from a number of background sources including existing reports, field observations, and interviews with City and State agency staff. The data sources used are listed by subject category below.

Patron Origin Distribution and Mode Choice Analysis

Reports:

1. Institute of Transportation Engineers, Technical Council Committee 6A5, Traffic Considerations for Special Events, An Informational Report, 1976.
2. Edward M. Whitlock, Eno Foundation for Transportation, Parking for Institutions and Special Events, 1982.

Interviews:

1. John Ashwood, Consultant DeLCAN, Toronto, Canada, telephone conversations, March 1983.

2. Jim Davis, Division of Traffic Engineering, City of Atlanta, telephone conversations regarding traffic and parking at Atlanta Stadium, March 1983.

Model and Demand Elasticity Data

Reports:

1. Cambridge Systematics, Inc., Travel Model Development Project for Metropolitan Transportation Commission, Final Report, Volume II, June 1980, pgs 11.17-1 to -29.

2. Y. Chan, et al, Pennsylvania Transportation Institute, Review and Compilation of Demand Forecasting Experience, Report No. PTI-7708, 1977.

3. City and County of San Francisco, Department of Public Works, Division of Traffic, Report on Candlestick Park Access, 1981.

4. Thomas Domenich and David McFadden, Urban Travel Demand, North Holland, New York, 1975.

5. Daniel McFadden, et al, U.C. Berkeley, Institute of Transportation Studies, Demand Model Estimation and Validation, Volume 5, Final Report Series, Urban Travel Demand Forecasting Project, Report #UCB ITS-SR-77-9, June 1977.

6. Thomas Parody, Transportation Research Board, Techniques for Determining Travel Choices For a Model of Non-Work Travel, Transportation Research Record No. 673TRB, 1978.

Interviews:

1. Sam Arabaglou, Former Business Manager, Candlestick Park, City and County of San Francisco, Department of Recreation and Parks, telephone conversations, 1983.

2. Frank Bauer, San Francisco Municipal Railway, telephone conversations, March 10 and April 11, 1983.

3. Scott Schoaf, City and County of San Francisco Department of Public Works, Traffic Division, telephone conversations, March 17 and 24, 1983.

San Francisco Bay Area Forecasting Data

Reports:

1. Greig Harvey, Institute of Transportation Studies, University of California Berkeley, Travel Profiles for Bay Area Workers, 1979.

2. Metropolitan Transportation Commission, Highway SKIMS, 80-1, Mid-day San Francisco Bay Area Inter-zonal Travel Times, 1982.

3. Metropolitan Transportation Commission, Transit SKIMS, 80-1, Mid-day, San Francisco Bay Area Inter-zonal Travel Times, 1982.

4. Metropolitan Transportation Commission, Zonal Level of Service Auto Mode Variables, April 1983.

5. Metropolitan Transportation Commission, MTCFCAST MODEL, 1965 Validation Step Number 1, Data File Totals and Averages, 1977.

Interviews:

1. Ben Chuck, California Department of Transportation, District 4, telephone conversations, March 1983.

2. Eric Harris, Alameda-Contra Costa Transit, Planning and Research Department, telephone conversations, March 1983.

Traffic

Reports:

1. CALTRANS, 1981 Traffic Volumes on California State Highways.

2. DKS Associates, Evaluation of Proposed Transportation Changes on Third Street, 1980.

3. Institute of Transportation Engineers, Traffic Considerations for Special Events, 1976.

4. Institute of Transportation Engineers, Transportation and Traffic Engineering Handbook, 1982.

5. JHK & Associates, King County Stadium and CBD Transportation and Parking Management Strategies, Various Reports.

6. Kell, J.H. & Fullerton, I.J., Manual of Traffic Signal Design, Institute of Transportation Engineers, 1982.

7. Parsons, Brinkerhoff, Quade & Douglas, Inc. (prepared for CALTRANS), I-280 Transfer Concept Program, Narrative Description & Sketch Plan of Alternatives, 1982.

8. Transportation Research Board, National Academy of Sciences, Interim Materials on Highway Capacity, Transportation Research Circular 212, TRB, 1980.

9. Various draft documents regarding Mission Bay transportation evaluations.

Interviews:

1. Norman Bray, City and County of San Francisco, Department of Public Works, Traffic Engineering Division
2. Frank Cannizzara, City and County of San Francisco, Redevelopment Agency
3. Ben Chuck, California Department of Transportation
4. Thomas Conrad, City and County of San Francisco, Redevelopment Agency
5. Ann Hansen, California Department of Transportation, Deputy District Director
6. Robert Isaacson, City and County of San Francisco, Redevelopment Agency
7. Ron Loewen, City of Seattle, Engineering Department
8. William Marconi, City and County of San Francisco, Department of Public Works, Bureau of Engineering
9. Robert Reeves, City and County of San Francisco, Department of City Planning
10. Russel Sayre, California Department of Transportation, I-280 Transfer Concept Program Project Director
11. Scott Schoaf, City and County of San Francisco, Department of Public Works, Traffic Engineering Division
12. Allan Tan, California Department of Transportation, Traffic Operations
13. Donald Tong, California Department of Transportation, Bridge Operations
14. William Van Gelder, City of Seattle, City Traffic Engineer

Parking

1. City and County of San Francisco, Department of City Planning, Downtown Parking Inventory, 1982.

2. City and County of San Francisco, Department of City Planning, Peripheral Parking Opportunities in the South of Market Area, A background paper for the Downtown Plan, December 1982.

Transit

Reports:

1. Frierson, John J., Designing for Pedestrians - A Level of Service Concept, HRR355, 1971.

2. JHK & Associates, Anaheim Commercial/Recreation Area Transportation & Circulation Management Study, 1980.

Interviews:

1. Frank Bower, San Francisco Municipal Railway

2. Tony Bruzzone, San Francisco Municipal Railway

3. Gene Gardiner, Alameda-Contra Costa Transit Agency

4. Charles Romeyn, San Francisco Municipal Railway

C. ALTERNATIVES

Three alternative stadium sites within the proposed development area have been analyzed. These sites consist of the following:

- Site 7: At the eastern edge of the development area, bordered by King Street on the north, China Basin Channel on the south, Second Street on the east, and Third Street on the west.

- Site 14: Immediately west of Site 7, bordered by Townsend Street on the north, the China Basin Building on the south, Third Street on the east and Fourth Street on the west.

- Site 5: At the western edge of the development area, bordered by Townsend Street on the north, Channel Street on the south, Sixth Street on the east, and Seventh Street on the west.

The transportation and parking analysis has focused on two specific cases: a Sunday football event with a maximum capacity of 70,000 people and an evening baseball game with a maximum capacity of 50,000 people. It is assumed that no weekday events will occur at the stadium. Events such as Monday night football games are assumed to occur infrequently (maximum of 1-2 times per year) and are therefore not treated as a typical design condition in the following analysis.

D. ANALYSIS

The following analysis considers the predicted distribution of patron origins and transit/auto mode split as a starting point for assessment of transportation impacts of a downtown stadium. Based on these predictions, an assessment of traffic demand, corridor capacity, and transit impacts is discussed.

Prediction of Patron Origin Distribution

Very little, if any, difference in origin distribution exists among the alternative sites within the development area. The following discussion therefore treats the sites collectively rather than on an individual basis.

Predictions of origin distribution of patrons of a downtown stadium located within the proposed development area have been made utilizing a model derived from the Metropolitan Transportation Commission's (MTC) home based social/recreational distribution and mode split model (HBSRDM) of social and recreational trips in the San Francisco Bay Area.(1) The derived model states that origin distribution of stadium patrons is a function of a) accessibility and mode share provided by auto and transit stated as levels of service (travel times) from stadium market sector locations throughout the Bay Area; and b) average household incomes of stadium market sector locations in comparison to the San Francisco Bay Area region as a whole. A more detailed description of the equations and assumptions used in the model is provided in Appendix A.

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(1) Cambridge Systematics, Inc., Travel Demand Development Project for Metropolitan Transportation Commission, Final Report, Volume II, June 1980, Pgs. 11.17-1 to -29.

Table 1 shows the distribution of origins predicted for capacity football events at a downtown stadium in comparison to the current distribution of origins for Candlestick Park. The results indicate that a downtown stadium increases San Francisco patronage by 5 percent of total attendance, drawing 5,900 more people from the City than currently attend football games at Candlestick Park.(1) From the East and North Bay, market shares would show very small increases, at 20 percent and 7 percent respectively.

From the South Bay however, a 6 percent reduction of total attendance at football games would result when compared to existing conditions at Candlestick Park.

The changes in the origin distribution favors San Francisco more than the North and East Bay, even though the East Bay, especially, has a bigger relative increase in accessibility. This is because San Francisco remains relatively much more accessible than the north and east sector and thus picks up a greater share of what would otherwise be expected from the South Bay, assuming the programs support capacity attendance.

The equivalent distribution of origins of baseball patrons for a downtown stadium in comparison to Candlestick is shown in Table 2. The results are similar to football events, and indicate that a 4 percent increase in San Francisco patrons attending baseball games could be expected at a downtown stadium in comparison to Candlestick. Market shares from the East and North Bay would increase slightly by 1.5 percent each. However, patrons from the South Bay attending baseball games would drop by 7 percent in comparison to the existing conditions at Candlestick Park.

Mode Shares Prediction

Key issues in assessing the feasibility of a downtown stadium location are the share of attendance coming by transit, traffic congestion, the available parking supply, the capacity of transit, and the costs associated with handling any of these. All of these factors are related to the percentage of patrons using transit as a mode of transportation to stadium events. If the transit share is too low, there may not be enough parking to support the crowd, and traffic congestion may be intolerable, reducing the attractiveness of the events. But too much emphasis on transit may be costly to the provider or to the patrons, also suppressing attendance.

---

(1) The origin distribution model assumes that accessibility and population are the only factors controlling market drawing potential. Therefore, if an effective marketing campaign is not implemented along with development of a new downtown stadium, the predicted increase in patrons from San Francisco could be less than 5%.

TABLE 1

PREDICTED ORIGIN DISTRIBUTION

SUNDAY FOOTBALL AT DOWNTOWN STADIUM SITE WITHIN PROPOSED DEVELOPMENT AREA

Percent of Patrons From:	Candlestick Distribution(1)	Origin Distribution at Downtown Site
San Francisco	27%	32%
South Bay	47%	41%
East Bay	19%	20%
North Bay	7%	7%
Total	100%	100%

(1) A 1973 distribution from the 89 percent of capacity crowds who were season ticket holders (from 1981 Candlestick Park Access Report).

TABLE 2

PREDICTED ORIGIN DISTRIBUTION

WEEKEND BASEBALL AT DOWNTOWN STADIUM SITE
WITHIN PROPOSED DEVELOPMENT AREA

Percent of Patrons From:	Candlestick Distribution[1]	Origin Distribution at Downown Site
San Francisco	34%	38%
South Bay	43%	36%
East Bay	11.5%	13%
North Bay	11.5%	13%
Total	100%	100%

(1) A distribution from the Candlestick Park Access Report from an update of a prediction made by Department of Public Works in 1968.

The resolution of transportation issues is not attained by simply providing enough roadway, parking and transit capacity. Certainly, there can be no more bus riders than bus capacity, but it is also true that even existing capacity for any transportation system will not be used if better alternatives are perceived by the patrons.

This section predicts the likely choices of transportation mode by patrons assuming different pricing and levels of service of auto and transit modes, and assuming capacity exists or can be provided at one of these prices and levels. By comparing these predictions with the costs and other constraints of their associated services one can see the feasible or most likely outcomes. Hopefully, more than one feasible set will allow some optimization of the plan.

Two levels of analysis have been utilized in predicting mode choice for downtown stadium patrons. First, as a benchmark for comparison purposes, research on transit and auto mode access to stadiums in other cities throughout the country has been conducted. The results of this research are shown in Table 3. Public transit shares at comparable urban stadiums range from 10 percent to 32 percent. New York with its unique transit environment (and 50 percent transit to some stadium events) is not considered comparable, nor tabulated. Other figures in the table such as Cleveland's large (24 percent) private bus share and Kansas City's 25 percent share shuttle buses to nearby parking lots are not considered public transit, nor applicable to San Francisco.

Table 3 shows that the greatest transit shares are produced at the stadiums with special bus service or good rail access. Figure 1 plots the public transit share against a measure of parking availability - the number of spaces nearby divided by full attendance. There is some correlation but the range is quite large for prediction purposes. Figure 2 plots these shares against the overall share of transit usage in the metropolitan region from which the stadium draws. Again the spread is large but if park and ride services are excluded, there is a trend and it depends on the regional convenience of transit. It suggests that a region with 10 percent overall transit usage like the San Francisco Bay Area can expect at least 14 percent public transit, and up to 30 percent with special transit or good rail services.

In predicting the precise mode split for a downtown stadium within the proposed development area, a second level of analysis has been conducted which is based on M.T.C.'s mode and destination choice model for social and recreational trips described in the preceding section. The model has been simplified to account for two modes of travel (auto and transit) and adjusted to account for demand-price elasticities from other models and cities[1] and current mode choice at Candlestick Park. Based on

(1) Percentage change in demand for transit relative to changes in price.

TABLE 3

TRANSIT MODE SHARES FOR STADIUMS THROUGHOUT THE UNITED STATES

	Public Transit Modes (%)					Other Transit		
	Conventional Transit	Special Bus	Rail	Park & Ride Buses	SUM Public Transit	Taxi, Boat, etc.	Charter	Total
Atlanta	2	0	10	20	32	2	1	35
Baltimore	19*			0	19	1	8	28
Cleveland	neg.	20	10	0	30	neg.	24	54
Kansas City (1)	14*			0	14	0	1	15
Washington D.C.	15*			0	15	0	N/A	15
Oakland	neg.	0	19	0	19	0	5	24
Seattle	8*		1	6	15	5	6	26
Philadelphia (1)	10*			0	10	0	N/A	10
Pittsburgh	30*				30	N/A	N/A	30

(1) These stadiums had an additional 15 to 26 percent of attendance shuttling from nearby parking lots.

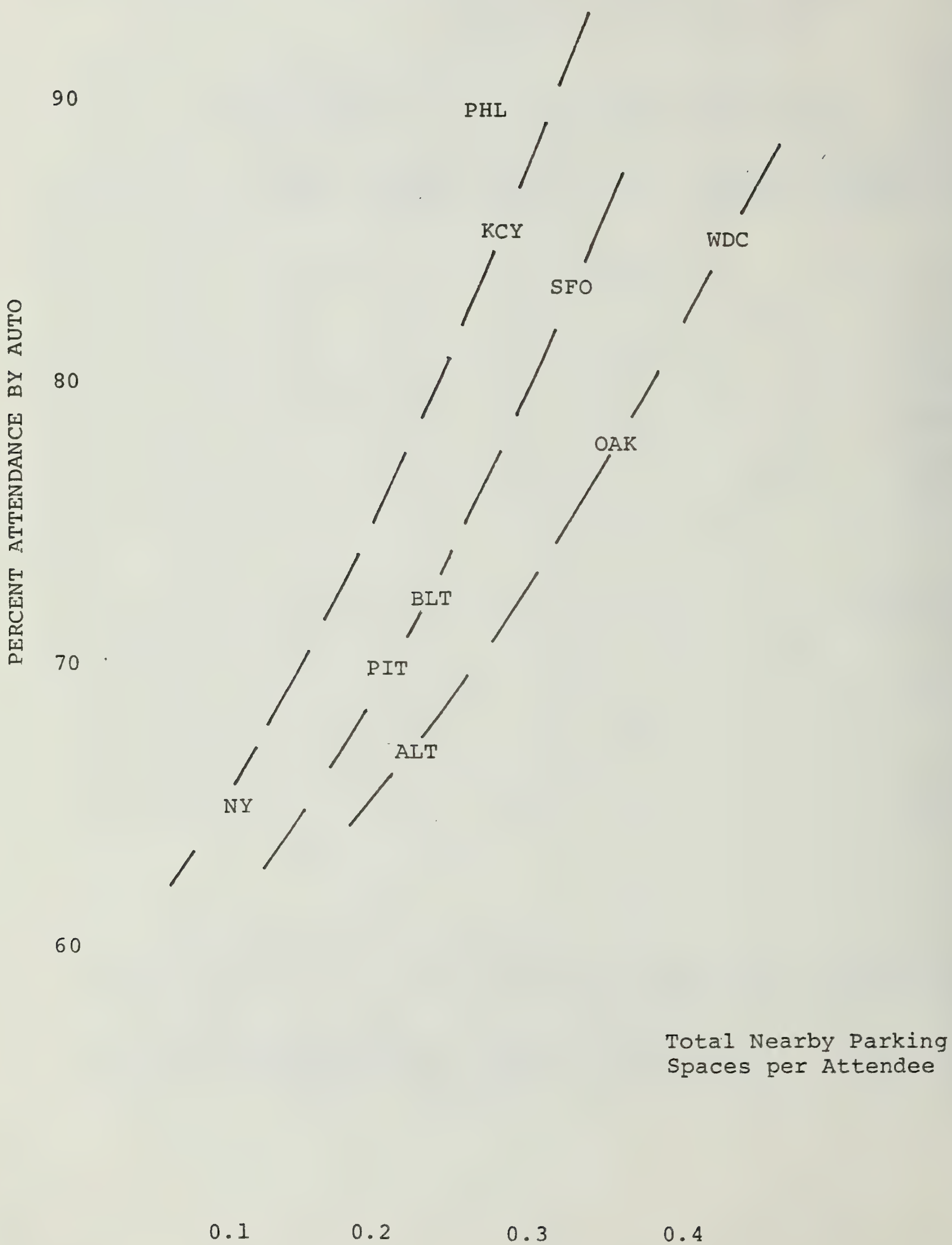
*Discrete breakdown of public transit mode shares not available for this stadium; single figure represents the combined mode share estimate for conventional transit, special bus, and rail service.

Figure 1.

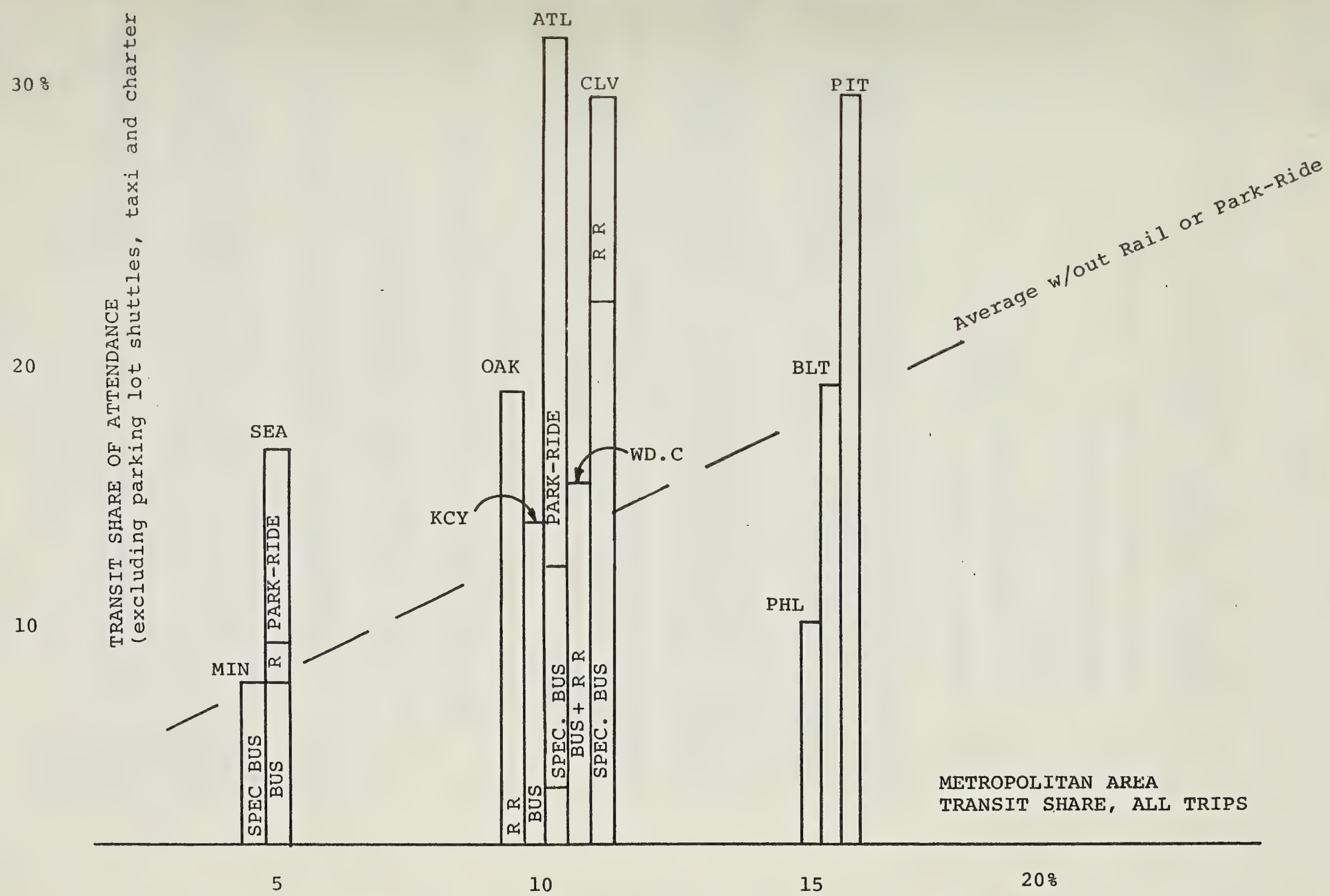
MODE SPLIT

VS

PARKING AVAILABILITY U.S. URBAN STADIUMS: FOOTBALL EVENTS



SUNDAY FOOTBALL TRANSIT SHARE
VS
METROPOLITAN AREA TRANSIT SHARE OF U.S. URBAN STADIUMS



these adjustments, the model essentially states that the proportion of patrons choosing transit versus the auto mode for travel to the downtown stadium is a function of:

- o transit and auto levels of service
- o costs for both modes
- o household sizes
- o auto ownership levels, and
- o household incomes

Bus and rail shares of transit are not predicted separately, but are added together (the model assumes travelers from each zone will use the fastest transit alternative). The charter and club bus share is accounted for separately. (Further discussion of the equations and assumptions used in the model is provided in Appendix A.)

Figure 3 graphically illustrates the form of the relationships in the mode shares prediction model. It also shows the weighted average of the predictions for the downtown stadium and the existing Candlestick transit share for Sunday football.

Predictions with the model were made for all sectors for the following full-capacity conditions:

Sunday football with parking price settling to $6.00/game in 1982$

Sunday football with $4.00 parking

Saturday baseball with parking price settling to $4.00/game, and

Saturday baseball with $6.00 parking.

All four of these sets of predictions are for standard transit fares, i.e. no special service or fares, in contrast to Candlestick Park.[1]

The two sets of transit share predictions for Sunday football are shown in Table 4. The shares are labeled "expected" at $6.00 parking ($8.00 in 1987 at six percent inflation). Parking prices have been based on what seems reasonable for a downtown site.

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(1) Predictions for premium service and corresponding fares gave slightly lower transit usage at the new site.

ILLUSTRATION OF MODE SHARE MODEL RELATIONSHIPS

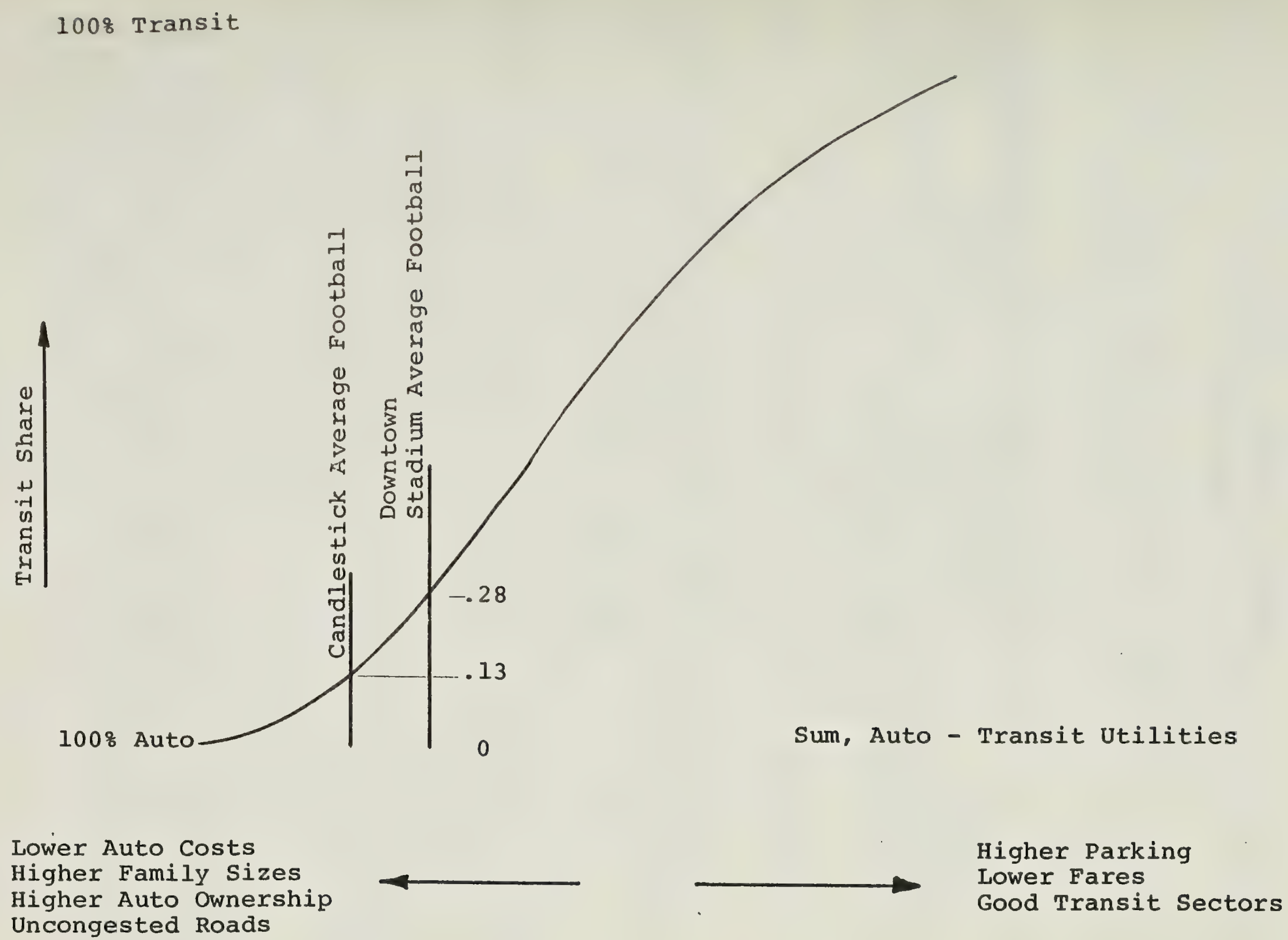

TABLE 4

PREDICTED PUBLIC TRANSIT SHARES[1]

SUNDAY FOOTBALL

(Using Off-Peak Transit Service and Standard Fares)

Percent of 70,000 Capacity Crowd

Origin Sector	Typical Origins Transit Fares -round trip-	Parking Scenarios Expected @ \$6.00	Possible @ \$4.00
San Francisco	Marina, Richmond, North Beach, Mission: \$1.20	44%	35%
South Bay	San Carlos, \$4.00 Saratoga, \$8.00	7%	5%
East Bay	Richmond, \$3.50 Walnut Creek, \$3.60	11%	8%
North Bay	San Rafael, \$4.00 Petaluma, \$5.60	7%	5%

(1) Excludes club buses which average 8% overall for capacity football games.

They represent a 50 percent increase over Candlestick Park but only a 20 percent increase over present levels at Moscone Center. The shares that would result from the price settling to $4.00 are also shown because there may be political or economic forces which hold parking prices down.

The expected transit shares from San Francisco are somewhat over twice that at Candlestick Park today. The shares from other sectors are all new behavior, compared to Candlestick where they were negligible.

Table 5 shows the equivalent predictions of public transit shares for weekend capacity baseball events. All input data and model assumptions are the same except:

1. The model calibration showed capacity baseball crowds to favor transit slightly more than football fans (smaller baseball crowds favored transit even more).

2. The expected parking price scenario for baseball is $4.00/ game because the smaller crowd will put less pressure on the supply and the price will drop (Saturday shoppers, etc., do not fill the gap). For comparison purposes however, the $6.00 parking price prediction is also shown.

The predicted transit mode shares are slightly less than for football.

The expected transit shares for baseball events are smaller than those for football because the parking prices are expected to be lower. This is true even though baseball fans have a slightly greater tendency to use transit.(1) The auto mode encouragement of a $2.00 smaller parking charge is greater.

Table 6 adds the club bus shares to the public transit share prediction for football and weights these by the origin sector distributions shown previously. This gives the summary total share all transit modes expected for capacity football - 28 percent of attendance. Since the club buses are not dependent on public transit service levels, they have been assumed to remain the same as at Candlestick Park (8 percent for football, 5 percent for baseball). Data on their distribution was not available except for comments from City staff that over 50 percent came from the South Bay. Distributing the remainder proportionally to their total sector share reveals the totals in the table.

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(1) According to data from capacity events at Candlestick Park, baseball fans have about a one out of a six percent greater propensity to use transit than football fans at capacity events. The differences have often appeared higher because percentage transit usage increases with smaller baseball crowds, and these are the percentages often compared with capacity football percentages.

TABLE 5

PREDICTED PUBLIC TRANSIT SHARES[1]

WEEKEND BASEBALL

(Using Off-Peak Transit Service and Standard Fares)

Percent of 50,000 Crowd

Origin Sector	Typical Origins Transit Fares -round trip-	Parking Scenarios Expected @ $4.00	Possible @ $6.00
San Francisco	Marina, Richmond, North Beach, Mission: $1.20	41%	50%
South Bay	San Carlos, $4.00 Saratoga, $8.00	6%	9%
East Bay	Richmond, $3.50 Walnut Creek, $3.60	10%	14%
North Bay	San Rafael, $4.00 Petaluma, $5.60	6%	9%

(1) Excludes club bus share which averages five percent overall for capacity baseball games.

TABLE 6

SUMMARY OF TRANSIT AND CLUB BUS SHARES

SUNDAY FOOTBALL AT DOWNTOWN SITE

EXPECTED SCENARIO[1]

	Transit Share Within Sector		Transit Contribution to Total Attendance	
Origin Sector	Public Transit	Club Bus	Public Transit	Club Bus
San Francisco	44%	4%	14%	1.3%
South Bay	7%	10%	3%	4.2%
East Bay	11%	8%	2.5%	1.6%
North Bay	7%	12%	0.5%	0.9%
Subtotal Transit Modes			20%	8%
Grand Total Transit Mode Shares			28%	

(1) At $6.00 parking and increased transit runs on standard lines with standard fares.

This is less than at comparable downtown-oriented stadiums in Atlanta (32 percent) and Cleveland (30 percent) with their special transit services. However, it exceeds the experience in Oakland (19 percent), with its good rail connection. Table 7 shows the equivalent of the totals in Table 6 but for capacity baseball events. Twenty-five percent of these crowds are expected to come by transit.

Traffic/Parking/Transit Analysis

The traffic elements for the downtown stadium sites were evaluated for two primary conditions - a Sunday 70,000 capacity football game and a weeknight baseball game. A wide fluctuation in attendance is anticipated at the baseball games. The evaluation made at a 50,000 attendance level represents a "worst case" situation. Lower attendance will reduce any impacts on the stadium area and the transportation system.

Transportation at a sports stadium involves three major components - arrivals by automobile, arrivals by transit (bus, train, etc.), and pedestrians. The pedestrian element is especially crucial in the immediate environs of a downtown stadium. Each of these elements will be discussed in greater detail in succeeding paragraphs.

The downtown site study area ranges from Second Street on the east to Seventh Street on the west and from Townsend on the north to the China Basin Channel on the south. The transportation analysis considered sites at either end of the corridor- Site 7 being between Second and Third Streets and Site 5 being between Sixth and Seventh Streets. Because there are very few differences in the transportation implications for each of the sites, specific analysis was focused on a demonstration site. Where differences exist, this is noted in the discussion.

Site 14, located between Third and Fourth Streets and between Townsend and the present China Basin Building, was chosen as the demonstration site. This site has street access on at least three sides and a preliminary site layout that provides an internal circulating roadway connecting a future King Street Parkway. The demonstration site also envisions structures in the four corners of the site (outside the circulating roadway) that will provide vertical access to an entry level of the stadium. Pedestrian over-crossings of Third, Fourth, and Townsend Streets will be necessary to load and unload the stadium. During a capacity event (70,000), approximately 57,000 fans must cross these streets. Since Third and Fourth Streets in particular are major access and transit routes, it is essential that the pedestrian and vehicular conflict be separated.

TABLE 7

SUMMARY OF TRANSIT AND CLUB BUS SHARES

WEEKEND BASEBALL AT DOWNTOWN SITE

EXPECTED SCENARIO[1]

Origin Sector	Transit Share Within Sector: Public Transit	Transit Share Within Sector: Club Bus	Transit Contribution to Total Attendance: Public Transit	Transit Contribution to Total Attendance: Club Bus
San Francisco	41%	2.5%	15.6%	1.0%
South Bay	6%	6%	2.3%	2.3%
East Bay	10%	5%	1.3%	0.7%
North Bay	6%	8%	0.8%	1.0%
Subtotal, transit modes			20%	8%
Grand Total Transit Mode Shares			25%	

(1) At $4.00 parking and increased transit runs on standard lines with standard fares.

The downtown sites are accessible from the major areas supplying the fans. The major inbound and outbound routes are identified on Tables 8 and 9, and are illustrated in Figures 4 and 5. Because there is no on-site parking, the destinations of the automobile drivers are initially spread over an area roughly bounded by Market Street on the north, First Street on the east, Sixth Street on the west, and Mission Rock Street on the south. These boundaries pertain primarily to the demonstration site and Site 7. If Site 5 at the western end of the study area were selected, the area would move westward to Tenth Street and southerly to Sixteenth Street. When the extensive parking facilities planned for the Mission Bay Development become available, there will be a greater concentration of destinations closer to the stadium site.

The primary area, particular that south of Interstate 80, is currently industrial in nature and is congested during the daytime hours. There is excessive truck loading and double parking in this area that contributes to the congestion. Many of the older buildings have loading docks that necessitate trucks blocking one or more lanes of traffic while loading or unloading. However, during the night-time hours and on weekends, traffic volumes are significantly lower. Superimposing the anticipated traffic load, both automobiles and buses, on existing traffic does not pose significant problems providing suitable marketing of parking locations is done in advance and there are means of directing patrons to available parking without penetration to the stadium site. The pre-game arrival pattern is normally distributed over a period of 90 minutes or more which will tend to distribute the traffic loading. Although the Mission Bay Project is expected to eventually provide large amounts of parking near the stadium site, there is sufficient parking within reasonable walking or shuttle bus distance to accommodate the anticipated demand. Tail gate parties at Candlestick Stadium have been very popular in the past. Although there is no centralized stadium parking to accommodate this activity, it is anticipated that on-street parking in the area may be utilized for tail gate parties, particularly in the near term before redevelopment takes away some of the open spaces that presently exist. (Parking is discussed in greater detail in Section C.)

Post-game discharge varies depending upon the excitement of the game, the score, and other factors. An exciting, close game will retain patrons until the end of the game. This constitutes the most intense discharge rate. Although patrons may leave the stadium within 30 to 40 minutes, the discharge from the area will last 60 to 90 minutes. Transit passengers on regular or special services will normally exit in the shortest time. Charter or club bus passengers must first walk to the staging area and then normally wait until the buses are loaded before being able to depart. Auto passengers must first walk to their vehicles and then depart. The dispersed parking locations spread the entry of automobiles into the traffic system and do not provide the same concentrations that occur from an on-site parking facility such as the Candlestick parking lot. There will be some congestion and

TABLE 8

INBOUND ROUTES TO DOWNTOWN STADIUM

From South, Southwest, & Peninsula

I-280 to	Sixth & Brannan New I-280 transfer touchdown Mariposa to Third Street
US-101 to I-80 to	Seventh Street Fourth Street Ninth Street
US-101 to Third Street	Vermont to Mariposa or Sixteenth Street

From West

Geary-O'Farrell to	Hyde to Eighth Street Jones to Sixth Street Mason to Fifth Street Stockton to Fourth Street
Oak to	Tenth Street US-101 to Seventh Street Fourth Street

Market Street
Sixteenth Street to Folsom
Army Street to Third Street

From North and Marin

Gough to US-101 to I-80 to	Seventh Street Fourth Street

Van Ness to O'Farrell
Hyde to Eighth Street
Jones to Sixth Street
Mason to Fifth Street
Stockton to Fourth Street
Montgomery to New Montgomery
Battery to First Street
Embarcadero

From East

Bay Bridge to	Fifth Street Eighth Street Fremont Street
San Mateo Bridge to	US-101

TABLE 9
OUTBOUND ROUTES FROM DOWNTOWN STADIUM

To South, Southwest & Peninsula

I-280 Corridor	Sixth & Brannan to I-280 New I-280 transfer touchdown to I-280 Third Street S to Mariposa to I-280	
US-101 Corridor	Fourth & Harrison On-Ramp Harrison at Seventh On-Ramp Tenth at Bryant On-Ramp South Van Ness On-Ramp	
Fourth Street South to	Third Street	

To West

Post-Geary Corridor	Third to Kearney Sixth to Taylor Seventh to Leavenworth Ninth to Larkin	to Post to Geary
Fell St. Corridor	Seventh to US-101 Fourth to US-101 Ninth to Hayes	to Fell
Sixteenth Street	Harrison to Sixteenth	
Army Street	Third to Army	
Market Street		

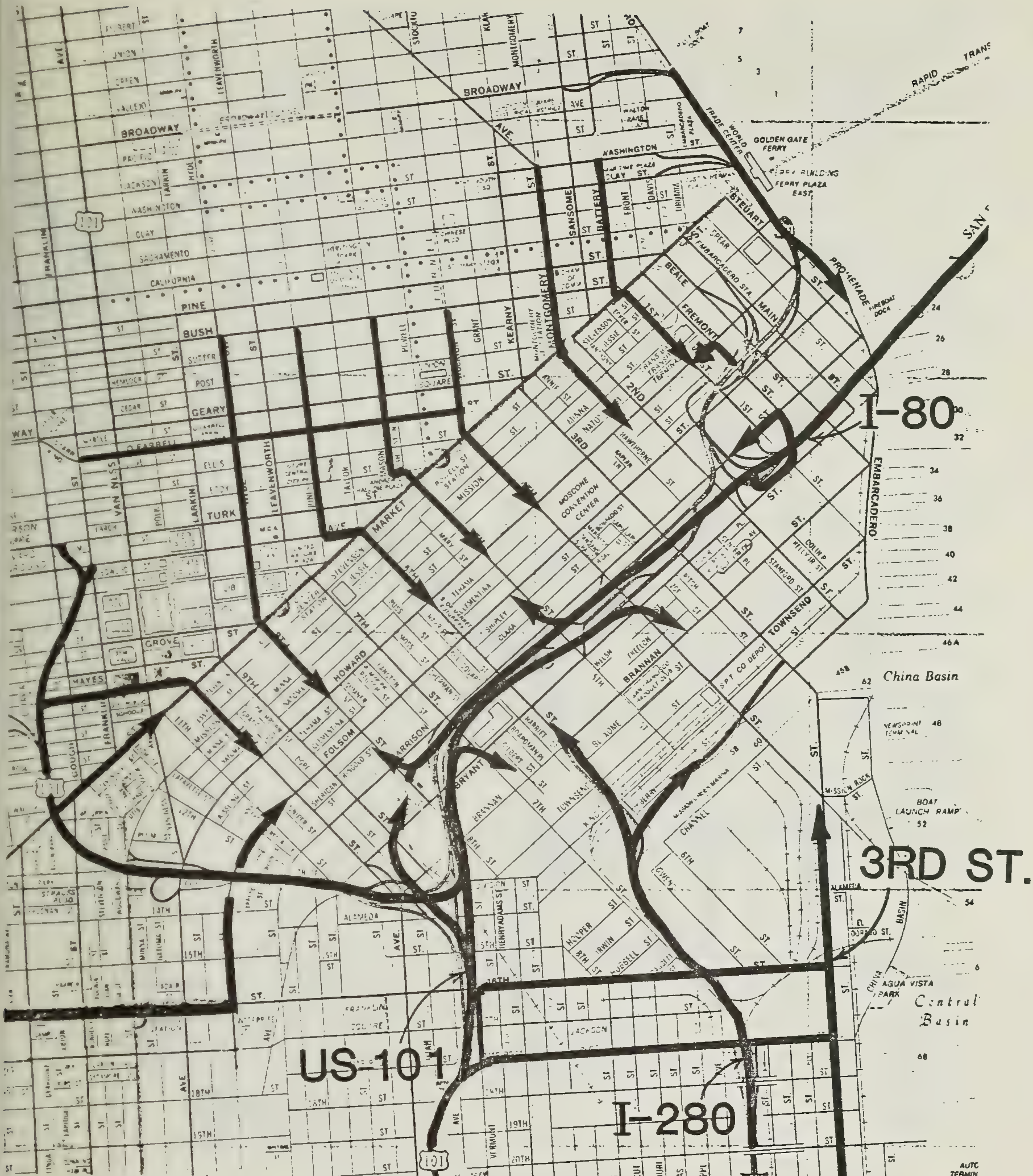
To North & Marin

Franklin Corridor	Fourth to US-101 Seventh to US-101 Ninth to Hayes	to Franklin

Seventh to Leavenworth
Sixth to Taylor
Fifth to Ellis
Third to Kearney
Embarcadero

To East

Bay Bridge	Fifth Street Bryant to Eighth Street Bryant at Sterling Street Harrison & Essex Street Harrison & First Street
San Mateo Bridge	South on US-101



MAJOR INGRESS ROUTES

FIGURE 4

MAJOR EGRESS ROUTES

FIGURE 5

delay at on-ramps to the freeway. These locations will undoubtedly require police officer point control. The volumes on the freeway will not normally be a controlling factor. For night games, this time element would be between 10 P.M. and midnight, for football games it would be 4 to 6 P.M. on Sunday afternoons.

a. Traffic Demand

For estimating traffic demand, the most conservative modal share and parking price scenarios discussed previously have been selected. For Sunday football, a capacity crowd of 70,000 is used with moderate parking fees ($4.00) and a modal share of 23 percent arriving by mass transit. For weeknight baseball, a crowd of 50,000 is used again with the $4.00 parking fee resulting in a modal share of 24.6 percent arriving by mass transit. Use of these assumptions reveals a worst case assessment of traffic impacts. Lesser crowds associated with most weeknight baseball games at least, of course, reduce the traffic demand proportionately and lessen any impacts in the stadium area and on the transportation system.

Origins were determined for four major areas - San Francisco, South Bay (Peninsula), North Bay, and East Bay. The number of patrons from each area was determined and the modal share (different for each origin) applied to determine the number of people arriving by automobile. A vehicle occupancy factor was used to determine the number of cars. An occupancy factor of 3.12 was used for football and a factor of 3.0 was used for baseball.

This analysis resulted in an estimate of 17,300 cars for Sunday football and 12,600 cars for a weeknight baseball crowd of 50,000. The trips from the origins were then assigned to the major corridors. Most assignments are obvious (e.g., North Bay trips arrive from the north). A small portion of the East Bay trips will utilize the San Mateo-Hayward Bridge and approach the stadium from the south. The San Francisco trips arrive by three corridors - North, West, and South depending upon where they actually begin their trip. The results of the assignments are presented in Table 10, and the corridor flows are illustrated in Figures 6 and 7.

It is emphasized that these values are anticipated maximums. They represent a capacity football crowd and a very large baseball crowd (Giants opening day in 1983 had an attendance slightly over 50,000). A 20,000 attendance baseball game would generate only 5,000 automobiles. Also, if more people can be induced to shift to transit, the number of automobiles will be reduced.

TABLE 10

FOOTBALL SUNDAY (70,000 Attendance*)

Corridor	Auto Trip Origins S.F.	So.Bay	No.Bay	East Bay	Total
South & Southwest	1,250	7,850	--	150	9,250
West	2,250	--	--	--	2,250
North	900	--	1,300	--	2,200
East	--	--	--	3,600	3,600
TOTAL	4,400	7,850	1,300	3,750	17,300

*77 percent arriving by automobile

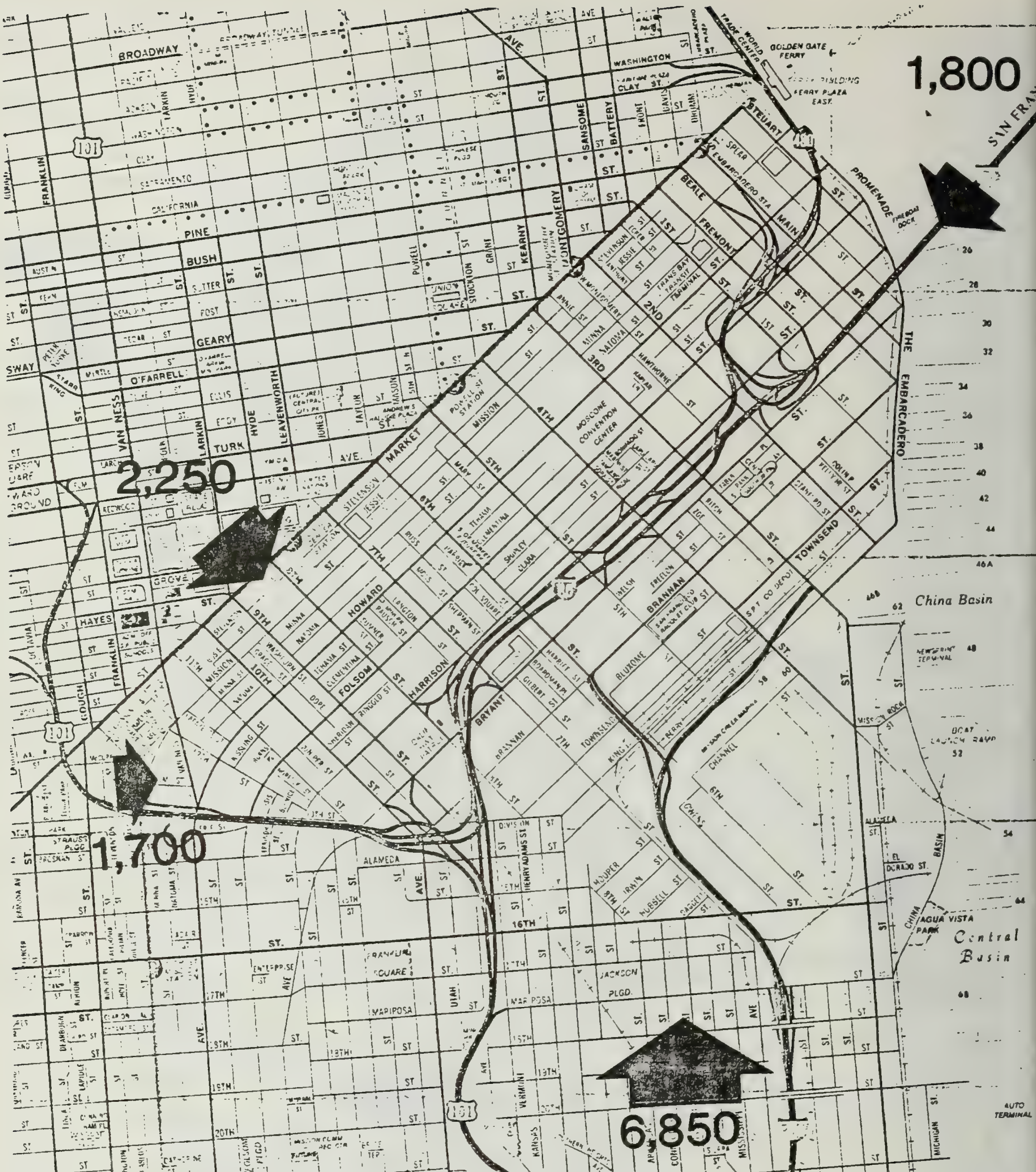
WEEKNIGHT BASEBALL (50,000 Attendance**)

Corridor	Auto Trip Origins S.F.	So.Bay	No.Bay	East Bay	Total
South & Southwest	1,500	5,300	--	50	6,850
West	1,700	--	--	--	1,700
North	400	--	1,850	--	2,250
East	--	--	--	1,800	1,800
TOTAL	3,600	5,300	1,850	1,850	12,600

**75.4 percent arriving by automobile

SUNDAY FOOTBALL
70,000 ATTENDANCE

FIGURE 6



WEEK NIGHT BASEBALL
50,000 ATTENDANCE

FIGURE 7

b. Corridor Capacity and Level of Service

The stadium development area is served by well defined routes from the east and south. The northern and western quadrants, on the other hand, do not have concentrated route structures. Traffic originating from these quadrants has a variety of major streets to use to reach the stadium area as shown earlier in Figure 4. Because of the variety of routes available and because of the time periods involved (weekday evenings and weekend days), no serious capacity problems are anticipated. Brief delays may be encountered, but drivers familiar with the street pattern will shift to avoid congestion.

Traffic from the East Bay will be concentrated on the Bay Bridge. Only a small percentage will utilize the San Mateo-Hayward Bridge and US-101. The capacity of the Bay Bridge is approximately 9,500 vehicles per hour per direction. For weeknight baseball games, westbound traffic is less than half of capacity (4,500 vehicles from 6 to 7 P.M.) and can easily absorb the anticipated increase (1,800 vehicles) without undue delay or congestion. Level of Service B can be maintained. Similarly, after an evening game, the existing demand is low and the game traffic can be accommodated at Level of Service A. With the excellent levels of service achieved with a 50,000 patron baseball crowd, it is obvious that smaller crowds will have even less impact on the area and the Bridge.

Loading does become more intense for capacity crowds (70,000) at a Sunday football game. Westbound traffic on the bridge from 12 to 1 P.M. is approximately 6,600 vehicles per hour. This leaves a reserve capacity of 2,900 vehicles per hour. The Stadium demand is 3,600 vehicles over a 90 minute period. If 75 percent of this demand (2,700 vehicles) arrives in the 12 to 1 P.M. period, capacity is not exceeded (reserve capacity of 200), but the Bridge will be operating at Level of Service E. It will be necessary for the Bridge metering system to be operational to ensure smooth traffic flow. Post-game traffic may present a more serious problem if the egress pattern is concentrated (i.e., an exciting game wil all the fans remaining till the final gun). The Bridge is currently carrying approximately 6,000 vehicles per hour eastbound from 5 to 6 P.M. on Sunday. The addition of the estimated 3,600 stadium vehicles reaches the capacity of the bridge, and there can be problems at the on-ramps. The most apparent ramp is at Fifth and Bryant. This ramp will be overloaded unless sufficient drivers can be diverted to other ramps such as Sterling Street, Harrison and Essex, Harrison and First, and Bryant at Eighth.

Access from the south is via two freeways (US-101 and I-280) and Third Street. The combined directional capacity of the freeways is 13,300 vehicles per hour. The capacity of Third Street south of Fourth is 1,700 vehicles per hour. This provides a total directional capacity to the south of 15,000 vehicles per hour. A weeknight baseball game of 50,000 attendance generated 6,850 vehicles in this corridor. The existing northbound flow is approximately 7,250 vehicles from 6 to 7 P.M. for a total loading of 14,100 vehicles per hour or 94 percent of the available capacity (Level of Service E). Following the game, there are approximately 3,200 vehicles southbound in the corridor. When the total stadium load (6,850) is added, the total is 10,050 vehicles per hour, approximately 2/3 of the available capacity (also Level of Service B). Smaller crowds (less than 50,000) will have less impact in the area and on the corridor.

For a Sunday football game with a capacity crowd of 70,000, there are 9,250 vehicles wanting to use the southern corridor facilities. Existing traffic northbound from 12 to 1 P.M. on Sunday is approximately 4,700. The total demand of 13,950 is 93 percent of capacity. Pre-game volumes are normally spread over more than a one-hour period which would reduce the loading described above. Assuming 75 percent arriving in the one-hour period gives a total flow of 11,600 vehicles per hour or 77 percent of capacity which corresponds to Level of Service C. Actual counts were taken in April, 1983 at the northbound freeway off-ramps and northbound Third Street during the morning peak period. The total volume entering the area was 10,600 vehicles during the peak hour.

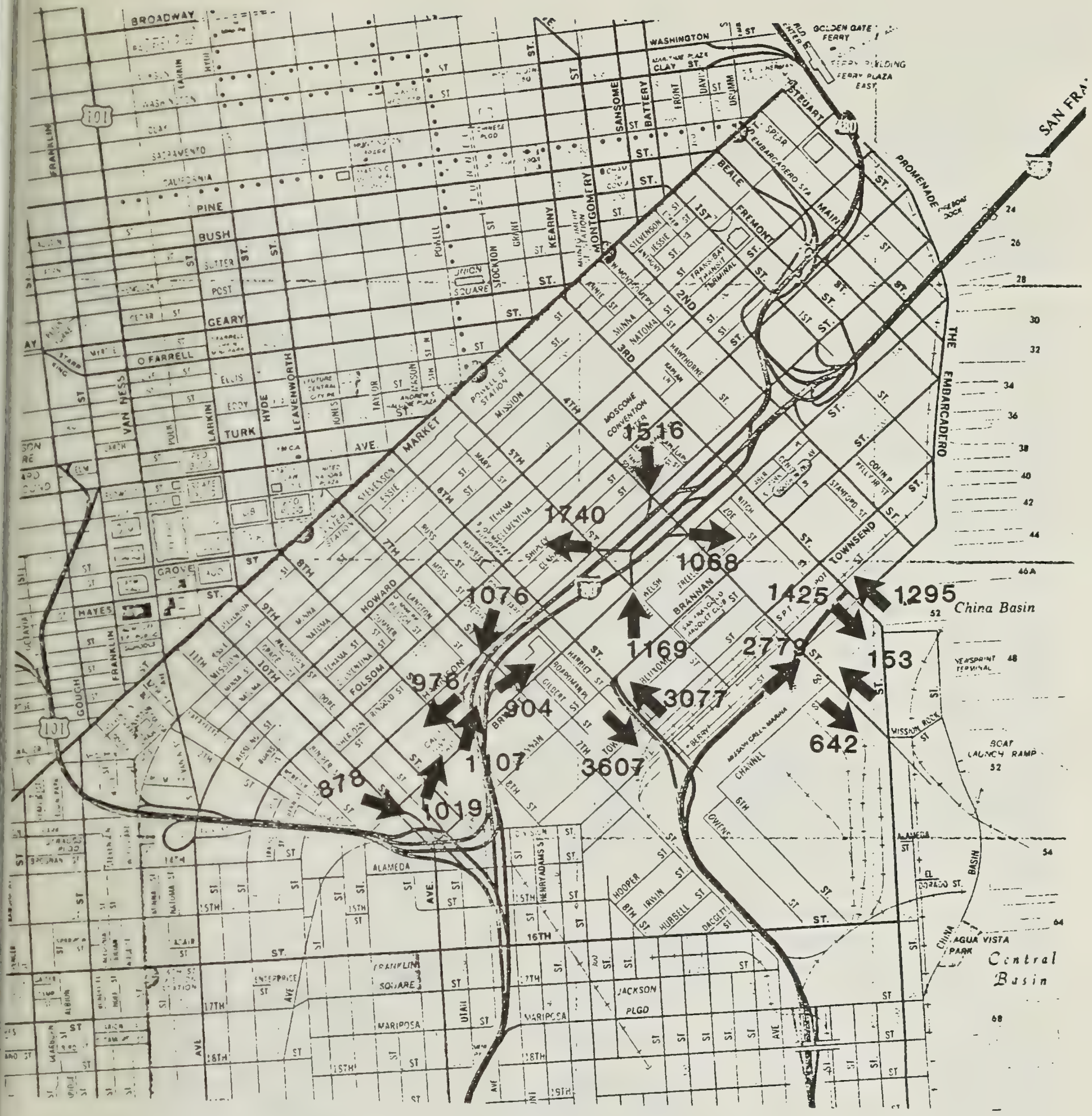
The post-game volumes on this corridor are also approximately 4,700 vehicles per hour. With the addition of 9,250 stadium vehicles, the total volume is 13,950 or 93 percent of capacity. April 1983 counts indicate the ability to load at least 8,800 vehicles onto the system from the stadium area. Peak flows are shown in Figure 8. Some of these flows are constrained by the heavy flow already on the freeway (e.g., the Seventh and Harrison on-ramp). These ramps could carry more traffic when the freeway is operating at lower flow rates. An additional on-ramp to I-280 is anticipated as part of the I-280 Transfer Program which will greatly increase the ability to load the freeway system.

c. Parking Impacts

1. Existing Downtown Parking Supply

An inventory of parking services within an access zone for pedestrians and shuttle buses shown in Figure 9 was identified in the following manner:

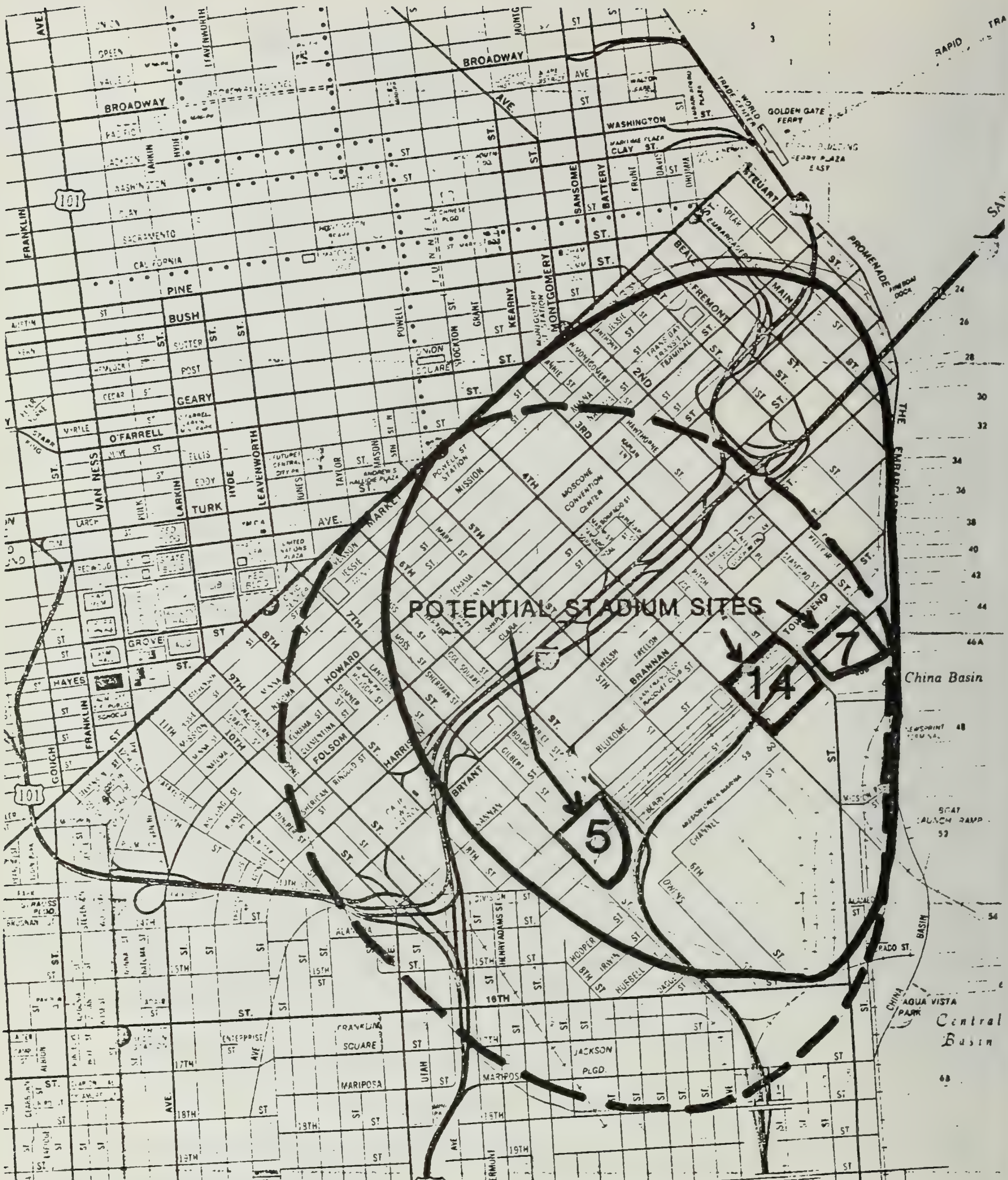
- Existing parking within a 20 minute walking distance of Sites 5, 7, and 14 were inventoried on a block by block basis.



CURRENT FREEWAY RAMP PEAK HOUR VOLUMES (APRIL, 1983)

FIGURE 8

Note: Volumes are highest peak hour volumes observed in either AM or PM peak.



PARKING ACCESS ZONES

20 MINUTE WALK ZONE, SITE 7 & 14

20 MINUTE WALK ZONE, SITE 5

FIGURE 9

- The total supply was disaggregated by the numbers of public and private spaces.
- The public parking supply was factored for availability during weekday, weeknight, and weekend periods to produce the net number of spaces likely to be available during these periods.

Table 11 provides a summary of parking supply. The table shows that there are approximately 22,101 total spaces (14,824 public spaces and 7,277 private spaces) accessible to Sites 7 and 14 within a 20 minute walking distance. Assuming joint use of private spaces, approximately 90 percent of this total supply (19,891 spaces) would be available during weeknights and weekend nights. Roughly 73 percent or 16,134 spaces would be available on Saturdays at noon. For Site 5, roughly 19,471 spaces (14,377 public spaces, and 5,094 private spaces) are accessible. Approximately 17,524 spaces would be available during weeknights and weekend nights and 14,214 spaces during Saturdays at noon. In addition, there are roughly 6,100 on-street spaces within a twenty minute walking distance of the stadium sites. Of this total, approximately 4,000-5,000 spaces would be available during weekends and weeknights.

2. Future Downtown Parking Supply

The downtown parking supply in the South of Market area is likely to undergo significant changes as new office development continues through the remainder of this century. Numerous projects are planned or have been completed which relate to the future of downtown parking.

The most significant new additions to the downtown parking supply in proximity to the stadium sites will be provided by the Mission Bay Mixed Use Development proposed by the Southern Pacific Development Company. This development may include up to 16,410 total spaces at completion. The parking supply potentially accessible to stadium patrons by 1990 may include only the early phase of the project consisting of parking proposed at the Banana Triangle (between Third and Fourth Streets) south of the channel. This area would contain about 2,480 parking spaces. Shortly thereafter, when Phase 2 of the project is completed, an additional 7,230 spaces may be available north of the channel. When this future supply is combined with the existing, unadjusted parking supply within a 20 minute walking distance of the site, between 29,000 and 32,000 spaces would be accessible to the three potential stadium sites.

TABLE 11

EXISTING PARKING SUPPLY AND

AVAILABILITY NORTH OF MISSION CREEK CHANNEL

	PARKING SUPPLY - 1983			AVAILABILITY OF PUBLIC PARKING (*)				
Zone	Public	Private	Total	Weekday AM	Weekday Noon	Weeknight After 5 PM	Saturday Noon	Saturday Night
20 minutes walking distance of Sites 7 and 14	14,824	7,277	22,101	2,075-2,668	1,038-2,075	13,342	10,822	13,342
20 minutes walking distance of Site 5 (**)	14,377	5,094	19,471	3,053-3,468	2,326-3,053	12,959	11,175	12,939

* Availability estimates based on Jefferson Associates' 1982 Public Parking Survey for Yerba Buena Gardens, as described below:

- o Weekday morning availability, 14 to 18 percent of supply
- o Weekday noon availability, 7 to 14 percent of supply
- o Weeknight availability, 90 percent of supply
- o Saturday noon availability, 73 percent of supply
- o Saturday night availability, 90 percent of supply

** Parking supply for Site 5 based on the following assumptions:

1. 70 percent of supply that is available to Sites 7 and 14 is available to Site 5.
2. Approximately 4,000 on-street public spaces available in the industrial and warehousing areas west and south of Site 5, that are not available to Sites 7 and 14.
3. Of the additional 4,000 public spaces, 60 percent would not be available during weekdays before 5 P.M., 90 percent would be available during nights and weekends.

3. Evaluation of Parking Demand and Supply for a New Downtown Stadium

A new downtown stadium of 70,000 seats would generate a parking demand of approximately 17,300 vehicles for capacity Sunday football game. Available supplies within the access zones of all three sites are sufficient to meet the demand of Sunday capacity football games, assuming both public and private parking lots and garages remain open and 90 percent of the total spaces are available. On Saturdays, less spaces would be available, but demand would also be less for a capacity baseball game (about 12,600 cars). Available supplies would be adequate for this situation as well as a weeknight capacity baseball game.

In the future, it is likely that existing parking spaces in the downtown will be displaced as development occurs. The importance of another source of parking such as the Mission Bay supply will therefore increase. If the Mission Bay supply does not become available, city policy should seek to protect existing supplies by requiring replacement of parking that may be displaced by future development.

d. Transit Analysis

The scenarios presented in this section for the proposed downtown stadium location is based on trip origin distributions and estimated transit mode shares discussed previously. The analysis focuses on a Sunday football game with a capacity attendance level of 70,000. A relatively high parking fee ($6.00) was assumed which produces a 27.5 percent transit share of the patronage. This was taken as a "worst case" scenario. Five transit scenarios were developed to evaluate transit access in this type of situation. A 50,000 attendance baseball game was also analyzed as a maximum weeknight event. The aim of this analysis is to identify the number of transit vehicles that would need to access the stadium and the facilities needed to accommodate them.

Load factors are a critical element in evaluating future transit ingress and egress situations at a downtown stadium site.[1] Load factors can vary by a factor of 4-5 depending on the transit mode and the type of equipment used. High load factors enable less equipment to be used and lower the cost to transit carriers as well as simplifying operations at the stadium. However, unreasonably high load factors may not be compatible with providing comfortable and convenient service that will increase the transit mode share of 27.5 percent level established as a target for the new stadium site.

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(1) Load factor is the ratio of bus passengers to number of seats.

Bus load factors were established from Muni records for Candlestick Park operations in the 1982 season. Muni records the number of Candlestick patrons who arrive on Muni buses and the number of buses required to handle post-event return-trip conditions. Assuming that the number of transit patrons is the same for pre-event and post-event, the average loading per bus is 53 passengers. This value was used generally as a norm in estimating equipment requirements, although higher loadings are often recorded for Muni and 60 passengers is assumed for shuttle-type operations. Muni plans to operate articulated buses in the near future. Maximum loading of 100 passengers per bus (outbound) was assumed for this equipment.

Loadings of 150 passengers per car were assumed for special Southern Pacific/CALTRANS trains used for stadium events. Assuming eight-car trains, maximum reasonable capacity would be 1,200 passengers.

When Muni extends the Muni Metro to the proposed stadium site, it is assumed that four-car trains will be used to accommodate post-event conditions. At 150 passengers per car, 600 passengers could be carried on four-car trains.

To estimate transit impacts a benchmark transit mode share of 27.5 percent has been used.[1] Thus the transit and traffic impact analysis (which assumes 24.6 percent transit mode share) reveal the most conservative situation for each mode. Realistically, the impacts on one of these modes will be slightly less than what is described.

The extension of Muni Metro to the downtown stadium site(s) makes transit much more attractive than it would otherwise be as a mode of access for San Francisco stadium patrons, and will help significantly in achieving the 27.5 percent modal share target set for this location.

In the event that the Muni Metro extension does not occur before a new stadium is completed, several scenarios have been developed with the present system as the baseline service. One scenario assumes full operation of the extended Muni Metro line.

Use of articulated trolley buses on the 30-Stockton line and other lines will enhance access to the stadium and minimize cost and loading congestion at the stadium. Articulated motor coaches are to be available within a year or two, while articulated trolley coaches are still four to five years away.

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(1) As a "sensitivity" test, a 30 percent mode share assumption is used in two cases to illustrate the implications of even greater transit use.

Two concerns are paramount in providing transit service to stadium events: bus parking and bus loading. Bus parking is required for charter and club buses and other long-haul buses from the time of arrival to the time of departure. Passengers can be expected to re-board buses at this area, and curbside loading facilities are not assumed to be required.

For Muni buses, curbside loading (such as used at Candlestick Park) is considered necessary to provide convenient service. In addition, a ready-reserve storage area needs to be provided for buses waiting to access the loading area. Additional Muni buses would be called up from Muni storage yards as required.

Linear and area space required for these conditions was assumed to be as follows:

Curbside regular loading zone:
40 foot bus - 80 feet per bus
Articulated bus - 125 feet per bus

Off-street bus parking and storage:
Dense pack - 640 square feet per bus
Two-row tier parking - 800 square feet per bus

The general approach used to evaluate alternative transit scenarios was to establish a transit mode share target and then develop ways to achieve this through a mix of different modes under alternative loading conditions.

The focus of this analysis is on post-event conditions. It is at this time that demand for transit service is most concentrated and when access to buses and other transit modes must be conveniently proved. It is also the time when transit operations are most concentrated and when bus loading facilities have to operate most efficiently.

Five alternatives were evaluated for the "worst case" situation of a Sunday football game with a capacity attendance of 70,000 people. One alternative was evaluated for a weeknight/Saturday baseball game with an attendance of 50,000 people.

1) Scenario 1 - Base Case

This scenario assumes that Muni would continue to provide special service to and from stadium events and that only existing lines accessing the stadium would be used for scheduled, regular route service. Muni Metro and BART patrons would arrive and depart at the Powell Street Station and use a 30-Stockton Shuttle (95 percent) to the stadium or walk (5 percent). SamTrans, AC Transit, and Golden Gate Transit would operate directly to the stadium. The Golden Gate Ferry would berth at China Basin east of Third Street.

Table 12 shows the patronage carried on each of the transit modes operating in this scenario and the number of buses expected to operate in and out of the stadium.

2) Scenario 2 - Increased Charter Buses/Auto Diversion

This scenario is similar to Scenario 1 except that charter buses carry a greater share of the transit mode share. The number of charter buses was derived by scaling up from the number of charter buses observed during the 1983 Opening Day at Candlestick Park. This number was 100 buses for a 50,000 attendance event. For a 70,000 attendance event, a maximum of 142 charter buses are assumed to be used. The result of expanded charter carriers could be that there is a greater diversion from auto trips which would result in a 30 percent mode share rather than the 27 percent mode share assumed in the base case. All other transit patronage remains the same in this case. This scenario is presented in Table 13.

3) Scenario 3 - Increase Charter/Transit Diversion

This scenario is similar to Scenario 2 in that more charter buses are used to carry transit patrons. However, this scenario assumes that the charter trips reduce the share of transit trips carried by public transit operators. The overall transit mode share remains the same. In terms of impact on stadium facilities, the greater use of charter buses and the decreased use of public transit buses would reduce the on-street loading space required for Muni lines and require about one and one-half acres more of off-street parking for charter buses as in Scenario 2. Scenario 3 is presented in Table 14.

4) Scenario 4 - Enhanced Muni Scheduled Service

This scenario assumes that Muni will improve frequency of service on its scheduled Sunday lines to provide convenient service to stadium goers. Correspondingly, special service will be diminished. Much greater use of Muni Metro is assumed, as well as shuttle service between the Powell Street station and the stadium. The number of buses at the stadium decreases substantially in this scenario, reducing the amount of space required for off-street parking/storage. This scenario is presented in Table 15.

TABLE 12

DOWNTOWN STADIUM LOCATION SITES
TRANSIT PASSENGER AND VEHICLE TRIPS FOR SUNDAY FOOTBAL
SCENARIO 1 AT $6.00 PARKING

		SOUTH BAY	SN FSCO	EAST BAY	NORTH BAY	TOTALS
STADIUM ATTENDANCE	%	41	32	20	7	100
ATTENDANCE BY ORIGIN	NO.	28700	22400	14000	4900	70000
PRIVATE						
CHARTER BUS						
PATRONAGE		2870	896	1120	588	5474
PERCENT		10	4	8	12	7.82
BUSES		54	17	21	11	103
PUBLIC						
MUNI BUS SPECIAL						
PATRONAGE		0	5757	0	0	5757
PERCENT			25.7			8.22
BUSES		0	109	0	0	109
MUNI BUS SCHEDULED						
PATRONAGE		0	963	0	0	963
PERCENT			4.3			1.376
BUSES		0	18	0	0	18
AC TRANSIT						
PATRONAGE		0	0	420	0	420
PERCENT				3		0.60
BUSES		0	0	8	0	8
GGT BUS						
PATRONAGE		0	0	0	172	172
PERCENT					3.5	.245
BUSES		0	0	0	3	3
SAMTRANS						
PATRONAGE		804	0	0	0	804
PERCENT		2.8				1.15
BUSES		15	0	0	0	15
S.P./CALTRANS						
PATRONAGE		1091	0	0	0	1091
PERCENT		3.8				1.56
MUNI METRO+SHUTTLE						
PATRONAGE		0	1120	0	0	1120
PERCENT			5			1.6
BART+SHUTTLE						
PATRONAGE		115	2016	1120	0	3251
PERCENT		.4	9	8		4.64
FERRY						
PATRONAGE		0	0	0	172	172
PERCENT					3.5	.245

CONSTRAINTS

70000	STADIUM CAPACITY	PERCENT ON TRANSIT	27.46
53	PERSONS PER BUS		
100	PERSONS PER SHUTTLE	PATRONAGE ON TRANSIT	19222
		BUSES AT THE STADIUM	256
		SHUTTLE PATRONAGE	4152
		5% WILL WALK	219
		NUMBER OF SHUTTLE TRIPS	42

TABLE 13

DOWNTOWN STADIUM LOCATION SITES
TRANSIT PASSENGER AND VEHICLE TRIPS FOR SUNDAY FOOTBAL
SCENARIO 2 AT $6.00 PARKING

		SOUTH BAY	SN FSCO	EAST BAY	NORTH BAY	TOTALS
STADIUM ATTENDANCE	%	41	32	20	7	100
ATTENDANCE BY ORIGIN	NO.	28700	22400	14000	4900	70000
PRIVATE						
CHARTER BUS						
PATRONAGE		3645	1478	1484	715	7323
PERCENT		12.7	6.6	10.6	14.6	10.46
BUSES		69	28	28	13	138
PUBLIC						
MUNI BUS SPECIAL						
PATRONAGE		0	5757	0	0	5757
PERCENT			25.7			8.22
BUSES		0	109	0	0	109
MUNI BUS SCHEDULED						
PATRONAGE		0	963	0	0	963
PERCENT			4.3			1.376
BUSES		0	18	0	0	18
AC TRANSIT						
PATRONAGE		0	0	420	0	420
PERCENT				3		0.60
BUSES		0	0	8	0	8
GGT BUS						
PATRONAGE		0	0	0	172	172
PERCENT					3.5	.245
BUSES		0	0	0	3	3
SAMTRANS						
PATRONAGE		804	0	0	0	804
PERCENT		2.8				1.15
BUSES		15	0	0	0	15
S.P./CALTRANS						
PATRONAGE		1091	0	0	0	1091
PERCENT		3.8				1.56
MUNI METRO+SHUTTLE						
PATRONAGE		0	1120	0	0	1120
PERCENT			5			1.6
BART+SHUTTLE						
PATRONAGE		115	2016	1120	0	3251
PERCENT		.4	9	8		4.64
FERRY						
PATRONAGE		0	0	0	172	172
PERCENT					3.5	.245

CONSTRAINTS

70000	STADIUM CAPACITY	PERCENT ON TRANSIT	30.101
53	PERSONS PER BUS		
100	PERSONS PER SHUTTLE	PATRONAGE ON TRANSIT	21071
		BUSES AT THE STADIUM	291
		SHUTTLE PATRONAGE	4152
		5% WILL WALK	219

TABLE 14

DOWNTOWN STADIUM LOCATION SITES
TRANSIT PASSENGER AND VEHICLE TRIPS FOR SUNDAY FOOTBAL
SCENARIO 3 AT $6.00 PARKING

		SOUTH BAY	SN FSCO	EAST BAY	NORTH BAY	TOTALS
STADIUM ATTENDANCE	%	41	32	20	7	100
ATTENDANCE BY ORIGIN	NO.	28700	22400	14000	4900	70000
PRIVATE						
CHARTER BUS						
PATRONAGE		6601	2677	2688	1299	13264
PERCENT		23	11.95	19.2	26.5	18.95
BUSES		125	51	51	25	250
PUBLIC						
MUNI BUS SPECIAL						
PATRONAGE		0	4189	0	0	4189
PERCENT			18.7			5.98
BUSES		0	79	0	0	79
MUNI BUS SCHEDULED						
PATRONAGE		0	717	0	0	717
PERCENT			3.2			1.024
BUSES		0	14	0	0	14
AC TRANSIT						
PATRONAGE		0	0	286	0	285.6
PERCENT				2.04		0.41
BUSES		0	0	5	0	5
GGT BUS						
PATRONAGE		0	0	0	80	80
PERCENT					1.64	.1148
BUSES		0	0	0	2	2
SAMTRANS						
PATRONAGE		316	0	0	0	316
PERCENT		1.1				0.45
BUSES		6	0	0	0	6
S.P./CALTRANS						
PATRONAGE		517	0	0	0	517
PERCENT		1.8				0.74
MUNI METRO+SHUTTLE						
PATRONAGE		0	694	0	0	694
PERCENT			3.1			.992
BART+SHUTTLE						
PATRONAGE		86	1366	602	0	2055
PERCENT		.3	6.1	4.3		2.94
FERRY						
PATRONAGE		0	0	0	78	78
PERCENT					1.6	.112

CONSTRAINTS
70000 STADIUM CAPACITY
53 PERSONS PER BUS
100 PERSONS PER SHUTTLE

PERCENT ON TRANSIT	31.71
PATRONAGE ON TRANSIT	22195
BUSES AT THE STADIUM	356
SHUTTLE PATRONAGE	2611
5% WILL WALK	137

TABLE 15

DOWNTOWN STADIUM LOCATION SITES
TRANSIT PASSENGER AND VEHICLE TRIPS FOR SUNDAY FOOTBALL
SCENARIO 4 AT $6.00 PARKING

		SOUTH BAY	SN FSCO	EAST BAY	NORTH BAY	TOTALS	
STADIUM ATTENDANCE	%	41	32	20	7	100	
ATTENDANCE BY ORIGIN	NO.	28700	22400	14000	4900	70000	
PRIVATE							
CHARTER BUS							
PATRONAGE		2870	896	1120	588	5474	
PERCENT		10	4	8	12	7.82	
BUSES		54	17	21	11	103	
PUBLIC							
MUNI BUS SPECIAL							
PATRONAGE		0	2076	0	0	2076	
PERCENT			9.27			2.97	
BUSES		0	35	0	0	35	@60/BUS
MUNI BUS SCHEDULED							
PATRONAGE		0	3459	0	0	3459	
PERCENT			15.44			4.94	
BUSES		0	58	0	0	58	@60/BUS
AC TRANSIT							
PATRONAGE		0	0	420	0	420	
PERCENT				3		0.60	
BUSES		0	0	8	0	8	
GGT BUS							
PATRONAGE		0	0	0	172	172	
PERCENT					3.5	.245	
BUSES		0	0	0	3	3	
SAMTRANS							
PATRONAGE		804	0	0	0	804	
PERCENT		2.8				1.15	
BUSES		15	0	0	0	15	
S.P./CALTRANS							
PATRONAGE		1091	0	0	0	1091	
PERCENT		3.8				1.56	
MUNI METRO+SHUTTLE							
PATRONAGE		0	2305	0	0	2305	
PERCENT			10.29			3.29	
BART+SHUTTLE							
PATRONAGE		115	2016	1120	0	3251	
PERCENT		.4	9	8		4.64	
FERRY							
PATRONAGE		0	0	0	172	172	
PERCENT					3.5	.245	

CONSTRAINTS

70000	STADIUM CAPACITY	PERCENT ON TRANSIT	27.46
53	PERSONS PER BUS		
100	PERSONS PER SHUTTLE	PATRONAGE ON TRANSIT	19222
		BUSES AT THE STADIUM	222
		SHUTTLE PATRONAGE	5278
		5% WILL WALK	278
		NUMBER OF SHUTTLE TRIPS	53

5) Scenario 5 - Muni Metro Extension

Scenario 5 assumes that Muni Metro will be extended to the stadium and beyond. The precise terminal locationis not clear, however the southern extremity is expected to carry a portion of Muni riders who would otherwise come by scheduled bus. No shuttles are necessary in this scenario because both BART patrons and Muni Metro patrons can take the Muni Metro directly to the stadium. The number of buses requiring loading space and parking at or near the stadium is vastly reduced in this scenario because of the Muni Metro access. This scenario is shown in Table 16.

6) Scenario 6 - Baseball 50,000 - Attendance Event

This scenario outlines a transit access plan for an evening event which may be more common. Lower attendance will reduce the transit requirements on essentially a straight line basis. Different transit trip origins, mode shares, and an overall 30 percent transit mode share are assumed for this case. This scenario differs from those discussed above in that shuttle service is provided to the Transbay Terminal, and AC Transit, SamTrans, and Golden Gate routes are assumed to terminate there rather than at the stadium.

The number of charter bus trips is much less than for football maximum capacity events because of the different assumptions about mode share and choice of public versus charter access. The overall number of buses requiring loading space and off-street parking/storage is also much less in the scenario (167 buses). This scenario is presented in Table 17.

7) Summary of Bus Loading and Parking/Storage Needs

Table 18 is a summary of bus loading space and parking/storage requirements for each of the six scenarios. Loading and storage requirements are generally based on the Candlestick Park operating procedure of providing curbside loading for Muni buses assigned to specific routes and locating charter buses and other operators' buses at a nearby off-street storage site during events.

For simplicity, a primary on-street loading space of 1,260 gross linear feet was assumed to be required for Muni assigned-route operations. A back-up bus reserve zone of 1,320 gross linear feet was also assumed. This back-up space is not adjacent to the stadium, but nearby so that buses can be brought up to fill vacated primary loading spaces.

TABLE 16

DOWNTOWN STADIUM LOCATION SITES
TRANSIT PASSENGER AND VEHICLE TRIPS FOR SUNDAY FOOTBALL
SCENARIO 5 AT $6.00 PARKING

		SOUTH BAY	SN FSCO	EAST BAY	NORTH BAY	TOTALS	
STADIUM ATTENDANCE	%	41	32	20	7	100	
ATTENDANCE BY ORIGIN	NO.	28700	22400	14000	4900	70000	
PRIVATE							
CHARTER BUS							
PATRONAGE		2870	896	1120	588	5474	
PERCENT		10	4	8	12	7.82	
BUSES		54	17	21	11	103	
PUBLIC							
MUNI BUS SCHEDULED							
PATRONAGE		0	3459	0	0	3459	
PERCENT			15.44			4.94	
BUSES		0	58	0	0	58	@60/BUS
AC TRANSIT							
PATRONAGE		0	0	420	0	420	
PERCENT				3		0.60	
BUSES		0	0	8	0	8	
GGT BUS							
PATRONAGE		0	0	0	172	172	
PERCENT					3.5	.245	
BUSES		0	0	0	3	3	
SAMTRANS							
PATRONAGE		804	0	0	0	804	
PERCENT		2.8				1.15	
BUSES		15	0	0	0	15	
S.P./CALTRANS							
PATRONAGE		1091	0	0	0	1091	
PERCENT		3.8				1.56	
MUNI METRO							
PATRONAGE		0	4381	0	0	4381	
PERCENT			19.56			6.26	
BART + MUNI METRO							
PATRONAGE		115	2016	1120	0	3251	
PERCENT		.4	9	8		4.64	
FERRY							
PATRONAGE		0	0	0	172	172	
PERCENT					3.5	.245	

CONSTRAINTS
70000 STADIUM CAPACITY
53 PERSONS PER BUS

PERCENT ON TRANSIT	27.46
PATRONAGE ON TRANSIT	19222
BUSES AT THE STADIUM	187

TABLE 17

DOWNTOWN STADIUM LOCATION SITES
TRANSIT PASSENGER AND VEHICLE TRIPS FOR BASEBALL
SCENARIO 6 AT $6.00 PARKING

		SOUTH BAY	SN FSCO	EAST BAY	NORTH BAY	TOTALS
STADIUM ATTENDANCE	%	36	38	13	13	100
ATTENDANCE BY ORIGIN	NO.	18000	19000	6500	6500	50000
PRIVATE						
CHARTER BUS						
PATRONAGE		1080	475	325	520	2400
PERCENT		6	2.5	5	8	4.80
BUSES		20	9	6	10	45
PUBLIC						
MUNI BUS						
PATRONAGE		0	6460	0	0	6460
PERCENT			34			12.92
BUSES		0	122	0	0	122
AC TRANSIT+SHUTTLE						
PATRONAGE		0	0	358	0	357.5
PERCENT				5.5		0.72
BUSES		0	0	7	0	7
GGT BUS+SHUTTLE						
PATRONAGE		0	0	0	293	293
PERCENT					4.5	.585
BUSES		0	0	0	6	6
SAMTRANS+SHUTTLE						
PATRONAGE		684	0	0	0	684
PERCENT		3.8				1.37
BUSES		13	0	0	0	13
S.P./CALTRANS						
PATRONAGE		864	0	0	0	864
PERCENT		4.8				1.73
MUNI METRO+SHUTTLE						
PATRONAGE		0	1140	0	0	1140
PERCENT			6			2.28
BART+SHUTTLE						
PATRONAGE		72	1900	553	0	2525
PERCENT		.4	10	8.5		5.05
FERRY+SHUTTLE						
PATRONAGE		0	0	0	293	293
PERCENT					4.5	.585

CONSTRAINTS

50000	STADIUM CAPACITY	PERCENT ON TRANSIT	30.03
53	PERSONS PER BUS		
40	PERSONS PER SHUTTLE	PATRONAGE ON TRANSIT	15015
		BUSES AT THE STADIUM	167
		SHUTTLE PATRONAGE	5291
		NUMBER OF SHUTTLE TRIPS	132

TABLE 18

SUMMARY OF SPACE REQUIREMENT FOR STADIUM BUS LOADING AND PARKING

		MUNI								CHARTER & CLUB		
		On-Site				On-Street			Off-Site Storage	Off-Street		
		Line Loading		Shuttle Bus		Ready Reserve		Local Routes				
Scenario	Total Buses	# Buses	Linear Ft.*	Spaces Needed	Linear Ft.*	# Buses	Linear Ft.‡	# Buses	# Buses	# Buses	Square Ft.*	Acres
1	256	16	960	7	420	32	1408	18	61	129	82,560	1.9
2	291	16	960	7	420	32	1408	18	61	164	104,960	2.4
3	356	14	840	5	300	28	1232	14	37	263	168,320	3.9
4	222	12	720	8	480	23	1012	58	--	129	82,560	1.9
5	187	--	--	--	--	--	--	58	--	129	82,560	1.9
6	167	16	960	8	480	14	616	18	74	45	28,800	0.66

* 60 ft./Bus
‡ 44 ft./Bus
+ 640 sq. ft./Bus

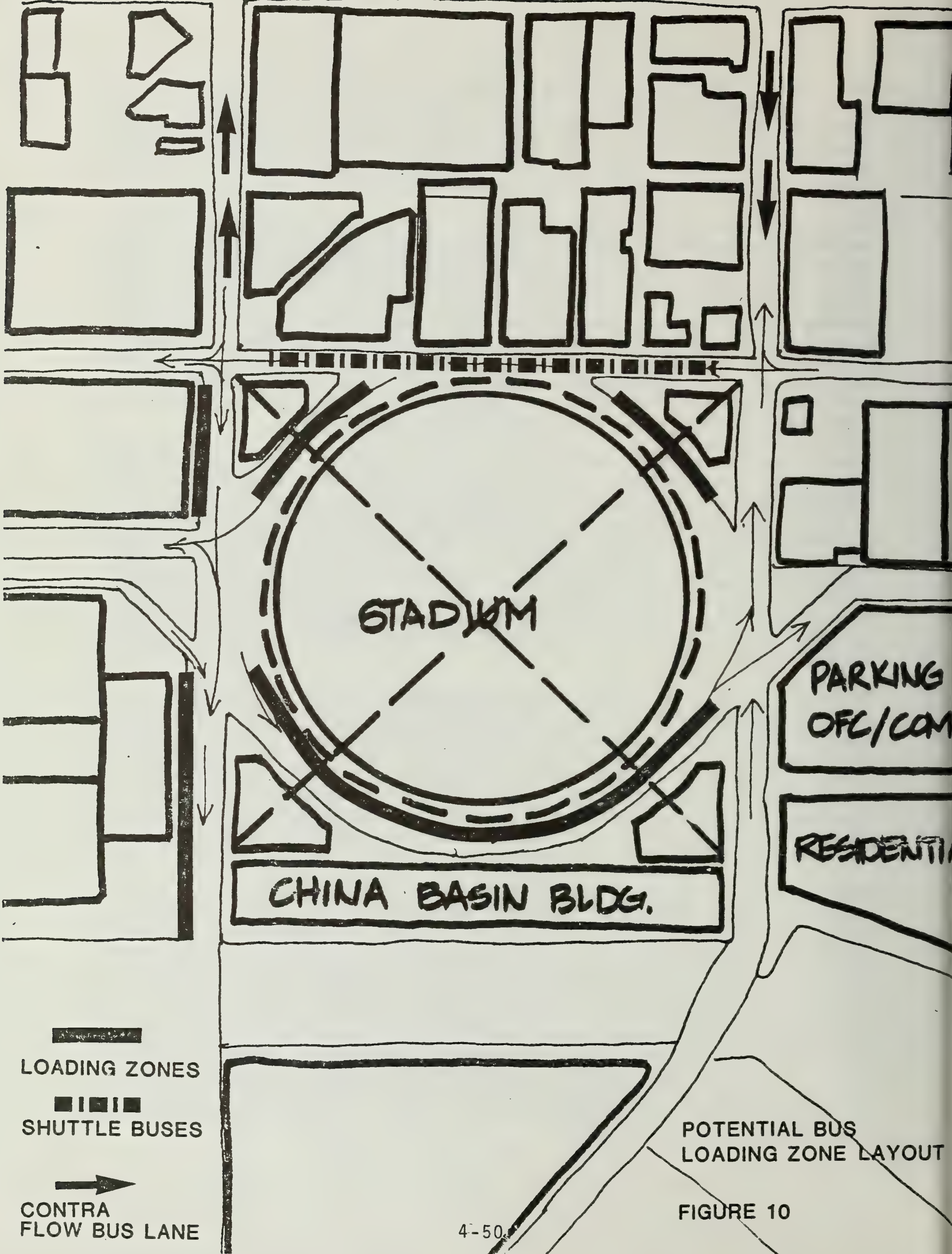
Off-street parking for charter buses is assumed to use the dense-pack parking plan with a gross square foot requirement of 640 square feet per bus. Total space requirements range from 74,240 square feet (1.7 acres) for the medium attendance baseball event, to 156,160 square feet (3.58 acres) for a capacity event and the transit plan described in Scenario 2.

Shuttle buses would require five to eight spaces of readily accessible curbside space to allow rapid loading, departure, and recycling. This is estimated to require 300 to 480 gross linear feet of space. Nose to tail berthing and 100 passengers per shuttle (outbound) is assumed here. More or less space could be needed if alternate assumptions are made about in-out operation and passenger loading. Each shuttle berth will handle 1,100 to 1,600 persons per hour per berth. There are five to eight berths indicated with capacities ranging from 5,500 to 12,800 persons per hour. In general, current estimates of shuttle patronage are less than 50 percent of the hourly capacity.

The curbside loading berths for Muni scheduled and special services have a capacity of 20 to 30 buses per hour depending upon the loading characteristics. Ths translates into a capacity of 1,000 to 1,500 passengers per berth per hour. The various transit scenarios have from twelve to sixteen berths or a bus capacity of 240 to 480 buses per hour which is equivalent to 12,500 to 25,000 passengers per hour capacity on scheduled and special services. Scenarios 1 and 2 use approximately 40 percent of the passenger capacity. Therefore the Muni share of stadium patronage could increase by two and a half times and still clear a capacity crowd in one hour.

Figure 10 shows a potential configuration of one possible layout at the demonstration site. The loading zones for specific routes are shown on the circumferential roadway and on Fourth Street. Shuttle buses are located on Townsend Street. The pedestrian level crossings of the streets permit ready access to buses in these locations. The ready reserve bus area could be south on Fourth (using the contra-flow lane for access), south on Third, or east on Townsend. The ready reserve area will be resupplied from a Muni yard or more remote storage area as required.

The off-street parking for club or charter buses should be within three or four blocks of the stadium site to minimize pedestrian flow and walking time. This parking could be south of the channel, utilizing part of the Third Street Bridge for pedestrian flow. It could also be north of the site where greater potential exists for a joint use facility with Golden Gate Transit or others. An alternative to off-street parking for these buses is on-street curb parking. Such curb parking could be achieved along Brannnan, Townsend (Except between Third and Fourth Streets), Fifth, and Second Streets. No charter or club buses could be parked on Third or Fourth Streets. Although this alternative eliminates the need for off-street space, it does remove almost 600 spaces near the stadium.



POTENTIAL BUS
LOADING ZONE LAYOUT

FIGURE 10

e. Transportation Improvements and Costs

The character of the area surrounding the stadium study area will undergo significant changes in the future. Planned developments such as Mission Bay and South Beach will cause transportation changes. The I-280 Transfer Project will make major changes in the transportation of the area. There are numerous long-range plans for improved transportation that will benefit the area as well as a downtown stadium.

The stadium, per se, requires relatively few improvements to be operational. Traffic improvements include the completion of the Third-Fourth Street one-way couplet south to their junction. On-street parking along both streets should be removed at least during game nights and weekends.

A special post-game traffic signal timing plan should be implemented in the South of Market area. This plan would provide maximum green intervals to departing traffic leading to freeway on-ramps and other major exit thoroughfares. The current signal system has the capability of providing this additional timing plan which would be called into operation manually shortly before the end of a major event. Low attendance events will not require this special timing plan.

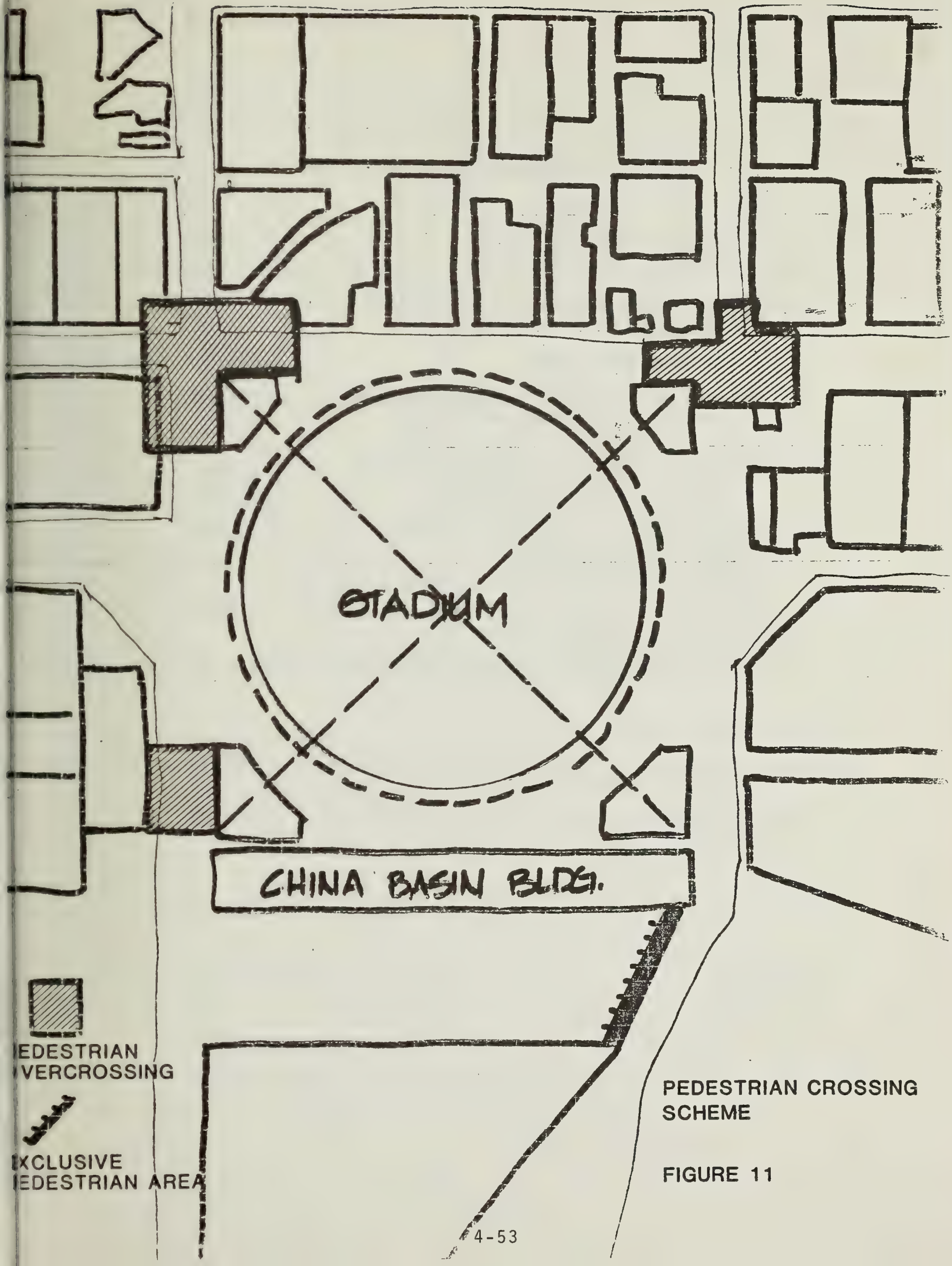
Contra-flow bus lanes are recommended for both Third and Fourth Streets to provide an efficient and effective access route to the stadium site for buses. Contra-flow lanes do not have the violations and encroachments from autos that with-flow diamond lanes have. This bus access is essential to provide shuttle service to the BART station and major parking facilities. The 30-Stockton trolley bus route could utilize these contra-flow lanes. Muni has indicated no problem in restringing the trolley lines and anticipates having articulated trolley buses by the time a stadium might open. The probable turn-around would be Townsend Street, although a more detailed analysis will be necessary when final designs are prepared. It is also necessary to integrate the bus stops with the Southern Pacific train station operation as well as the proposed Muni Metro and E Line extensions.

A storage lot and staging area is necessary for charter and club buses. It may be possible to park these buses along curbs on Brannan, Townsend, Fifth and Second Streets (approximately 12,500 linear feet of curb space woudl be necessary). However, a specific off-street area would be preferable and would be easier and more efficient to operate. An area close to the stadium for parking up to 250 club buses is needed. These buses proceed to the parking area before discharging their passengers. Passengers must then walk to the stadium. After the event, the passengers return to their specific bus in the parking area. In a "dense-pack" configuration, 250 buses will require an area of approximately four acres. It may be possible to develop a joint use lot with Golden Gate Transit or SamTrans who need bus storage facilities during weekdays but not during evenings or weekends.

Pedestrian movements will have to be carefully controlled. Movement of very large numbers of pedestrians in a downtown setting soon taxes the capacity of normal sidewalks. As indicated earlier, it will be necessary to provide a pedestrian level crossing over Third, Fourth, and Townsend Streets. One scheme is illustrated in Figure 11 for one possible stadium configuration. Also shown on the figure is an exclusive pedestrian area on the Third Street Bridge. This is the outboard lane on the west side of the bridge. The channel is a significant barrier to pedestrian movement. If parking is developed south of the channel or if the charter and club bus area is located there, then this additional pedestrian capacity is essential.

For capacity events, additional pedestrian facilities leading toward major parking concentrations will be required. This capacity may be provided by partial closing of some streets through closing one or more lanes with traffic cones. Specific locations would be determined at the time detailed traffic operations plans are developed.

Preliminary cost estimates for these transportation improvements are presented in Table 19. It is questionable whether the pedestrian overcrossings at the stadium site are a separate transportation cost or part of the normal cost of building the stadium.



PEDESTRIAN CROSSING SCHEME

FIGURE 11

TABLE 19

TRANSPORTATION IMPROVEMENTS

	Transportation Improvement	Cost
1.	Pedestrian Overhead Crossings at Third, Fourth, & Townsend	(1)
2.	I-280 Touchdown Ramp	I-280 Transfer Project
3.	Third-Fourth Street One-way Couplet Signing, Markings, and Signal	$ 20,000
4.	Contra-flow lanes on Third & Fourth	
	Signs, Markings & Signals	$ 30,000
	Muni Moving Trolley Wires	$100,000
5.	Stadium Timing Plan For South of Market Signal System	$ 30,000
6.	Pedestrian Usage of Third Street Bridge Signs, Markings & Controls	$ 5,000
7.	Charter & Club Bus Storage Area	$1.32 to 7.8 million(2)

(1) Pedestrian improvements and costs would relate to Mission Bay and I-280 Transfer Projects.

(2) Depending on transit scenario.

APPENDIX A

ORIGIN AREA DISTRIBUTION AND MODE CHOICE MODELS AND ASSUMPTIONS

APPENDIX A: ORIGIN AREA DISTRIBUTION AND MODE CHOICE MODELS AND ASSUMPTIONS

Origin Area Distribution Model

The major factors determining how a downtown location would change the distribution of patrons from the different sectors of the Bay Area are:

- o the travel times by highway and transit modes from each sector, and
- o the expected shares of patrons by both modes from each sector.

The regional home-based social/recreational distribution and mode choice (HBSRDM) model, developed by the Metropolitan Transportation Commission, relates these factors to trip distribution for the San Francisco Bay Area. The form of this model, expressed as the ratio of probabilities of distribution of trip-ends between any two areas i and j, is:

$$\frac{P_i}{P_j} = \frac{\exp(x_i + \beta INC_i \ln \overline{LOS}_i)}{\exp(x_j + \beta INC_j \ln \overline{LOS}_j)}$$, where:

- o $x_{i,j}$ are a sum of weighted attributes of the trip-ends i and j that do not change with changes in the forecast end of the trip,
- o $\beta INC_{i,j}$ are the model coefficient for travel time variables, times the annual household incomes in the origin areas, and
- o $\overline{LOS}_{i,j}$ are the composite (mode share-weighted averages) travel times between trip-ends i or j and the forecast trip-end.

The functions of this model, which relate the distribution of demand to accessibility, are as applicable to the origin distribution of demand from many to one destination as they are to the destination distribution from one origin.

The model has been used to represent the ratio of the distribution of demand between any pair of origins and one destination, i.e., a stadium location.

If only **changes** in the distribution (probability) ratio need to be expressed, a simpler form, eliminating all the non-accessibility factors (the x_i and x_j's), can be derived showing the ratio of distribution of patrons from any two origins to the downtown stadium in terms of the equivalent ratio to Candlestick Park.(1) Thus the ratio of the probabilities of patrons coming from two origins i and j to downtown P_{jD}/P_{iD} is expressed in terms of the equivalent ratio from Candlestick Park P_{jC}/P_{iC} as:

$$\frac{P_{jD}}{P_{iD}} = \frac{P_{jC}}{P_{iC}} \times \frac{\sum\limits_{M} \frac{P_{miC}}{(LOS_{miC})^{INC_i}} \quad \sum\limits_{M} \frac{P_{miD}}{(LOS_{miD})^{INC_i}}}{\sum\limits_{M} \frac{P_{mjC}}{(LOS_{mjC})^{INC_j}} \quad \sum\limits_{M} \frac{P_{mjC}}{(LOS_{mjD})^{INC_j}}}$$

where:

P_{miC}, P_{mjD}	are the mode (m) shares from sector i, j, etc., to C, and D respectively
$\sum\limits_{M}$	means the sum of the quotients over M = transit and auto
LOS_{miC},etc.	are the total travel times (levels of service) by mode m from a typical point in sector i to Candlestick, etc., and
INC_i, INC_j	are the ratios of the average household incomes in sectors i and j to the San Francisco Bay region.

Key points these models consider (which are often lost in intuitive or one-mode accessibility approaches) are both the modal shares and their relative utilities to patrons in getting to an event. For example, though a downtown stadium is clearly nearer the East Bay, it has little composite advantage in travel impedance over Candlestick because downtown sites have a relatively more congested access by auto as well as a higher share of transit use with its typically lower utility than auto.

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(1) This depends on noting that a) the x_i and x_j can be expressed in terms of the known distribution ratio for the old stadium site and its travel times, and b) the composite travel times for highway and transit from one area in these models is represented as the natural logarithm of the sum of exponentials of the βINC in LOS's per mode.

These models do not consider the saturation market of an area or the possibility that the generally decreased utility of travel to a downtown site may not be compensated for by its increased attractiveness. The composite utility of trips to a downtown site is usually lower due to increased parking congestion and cost as well as greater time consumed in the larger transit share. Fortunately, downtown sites usually have attraction factors that outweigh this general travel dis-utility. The market area saturation effect is beyond the scope of this transportation study.

The origin distribution model assumes that accessibility changes dominate the relative drawing power from different sectors. To the extent that other factors, unique to a sector, compete with or moderate accessibility, the changes in distribution may be less than predicted by the model equation. A check of the ability of the model to predict the observed distribution at Candlestick Park suggests that actual origin distribution changes may be only 60 to 70 percent of those predicted by an accessibility model alone.

Table 1 in Section III of the main report (Downtown Stadium Section) shows the distribution of origins predicted by this equation for football events. Data for P_{iC} was from the Candlestick Park Access Report, P_{miC}, etc., estimates from preliminary calculations of mode split, level of service (LOS) data from the M.T.C. 1980 530 zone off-peak travel time matrices (See main body of report, Section III.B. "Forecasting Data" items 2,3,&4) and income ratios per county from a 1975 M.T.C. report (III.B., "Forecasting Data" item 1).(1).

The level of service representing a sector was the average of travel times by each mode from two points in each sector judged by experience to represent geographic and socioeconomic subsegments of that sector. Following are the subareas averaged for each sector:

TABLE A-1

Sector:	**Representative Subareas:**
San Francisco (4 subareas)	North Beach, Marina, Richmond, and Mission Districts
South Bay	San Carlos and Cupertino
East Bay	Richmond (city) and Walnut Creek
North Bay	San Rafael and Petaluma

(1) Note the base Candlestick Park distribution and predictions are before the exit of the Raiders from the East Bay. If the new East Bay football team, the Oakland Invaders, fails to capture that old crowd, the East Bay may capture a larger share.

Mode Choice Model

As with distribution prediction, there are no readily available models applicable to predicting stadium mode choice. The objective of demand modeling is a) to obtain a confident prediction of modal usage for the unique transportation service and pricing levels at a downtown site, and b) to show how the modal shares might vary with different external or controllable scenarios or plans. The two major components of a prediction model are its qualitative or functional form and its quantitative coefficients or parameters.

Within modest ranges, the transportation service levels and cost parameters are the most critical. These parameters are most simply expressed as elasticities[(1)] (sensitivities) of modal demand to the major factors in choice (travel times and costs for each mode). Thus, the first step in selecting a quantitative model was to gather available data on elasticities of modal demand to modal prices and service levels. These were gathered from recreational and non-work trip studies, where possible, and for work trips if no other data existed. All the results are based on actual mode shares and field data. They are shown in Table A-2.

The elasticities vary considerably, even for one mode by one factor. One expected cause of this variation is the different ratios of transit to auto use, prices, and/or service levels in the areas studied. Data on the values of these factors was not available in most of the studies. Elasticities vary nearly proportionally to any one of these factors, with the others held constant.

Even the wide range shown is useful in judging the applicability of more detailed models. And, the average or typical values of the ranges observed are an indication of expected behavior. The last section of this appendix discusses the effect of these variations of model parameters on predicted results. The effects are not large.

The next step in selecting a mode prediction model was to find a relevant model structure with a record of prediction experience.

The mode choice component of the M.T.C. social/recreational demand model, used as a basis for the origin distribution results described earlier, was examined. Its logit structure (illustrated in section III D of the main report) is the most accepted in planning practice. It considers all of the cost, level-of-service and socio-economic factors of interest to the analysis of a change in the stadium location.

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(1) For example, the transit elasticity to parking price of the auto alternative is the percent change in the estimated transit share corresponding to a one percent change in the parking cost.

TABLE A-2

Mode Choice Elasticities

Factor (Elasticity of):	Elasticity of Transit Shares:	Elasticity of Auto Shares:	Trip Purpose	Source
Travel Time	-.24 to -.63	--	non-work	Y.Chan aggregate models (1)
"	-.2 to -.42	--	non-work	Chan, disaggregate models (1)
"	-.55	--	all trips	San Francisco 1960s empirical data (1)
"	-.72 to -1.08	--	shopping	T. Parody, Pittsburgh (3)
"	-.59 to -1.17	--	shopping	Domencich, Boston data (2)
"	-.84 to -1.1	-.75	work	K. Train, San Francisco 1975 (4
Trip Cost	-.11	--	all trips	San Francisco 1960s empirical data (1)
"	-.32	--	shopping	Domencich, Boston data (2)
"	-.19	--	all trips	McGillivray, San Francisco 1969 (2
"	-.51	--	shopping	T. Parody, Pittsburgh (3)
"	-.41	-.38	work	K. Train, San Francisco 1975 (4
"	-.65	-.2	recreation	CSI, San Francisco 1965 (5)

1. Y. Chan, et al, Pennsylvania Transportation Institute, Review and Compilation of Demand Forecasting Experience, Report No. PTI-7709, 1977.
2. Reported in "Some Evidence of Transit Demand Elasticities", by Michael Kemp, Transportation (journal), January 1973.
3. Thomas Parody, Transportation Research Board, Techniques for Determining Travel Choices For a Model of Non-Work Travel, Transportation Research Record No. 673TRB, 1978.
4. Daniel McFadden, et al, U.C. Berkeley, Institute of Transportation Studies, Demand Model Estimation and Validation, Volume 5, Final Report Series, Urban Travel Demand Forecasting Project, Report #UCB ITS-SR-77-9, June 1977.
5. Cambridge Systematics, Inc., Travel Model Development Project for Metropolitan Transportation Commission

The validity of this model was judged in the following three ways for application to our predictions:

- o Its modal elasticities were compared to prior reports as shown in Table A-2.
- o Its ability to retrospectively predict two previous changes in mode share at Candlestick, and
- o Its indications relative to the mode share observations at other downtown U.S. stadiums.

These examinations led to one significant adjustment of a coefficient in the model, whereupon it performed well by all three criteria. The steps in the modeling process and the coefficient adjustment are discussed below.

First, the unadjusted model was run and exhibited the following ranges of elasticities:[1]

Elasticity to:	**Elasticity of transit share**	**Elasticity of auto share**
Trip cost	-.65 to -1.2	-.21 to -.99
Travel time	- .5 to -1.1	-

All except one value (the -.99 auto cost elasticity) are quite reasonable compared to prior reports (Table A-2).

Second, a comparison of the ability of the model to predict the change at Candlestick in parking charges for football from $2.00 to $4.00 in the late 1970's was made. This showed the auto cost coefficient to be 2.4 times higher than indicated by the observed change in mode shares at that time. This is similar to the ratio of the high end of the auto cost elasticity range for the M.T.C. model and the maximum in Table A-2. Thus this cost coefficient was adjusted down by a factor of 2.5 for our predictions. The resulting range of auto cost elasticity in the model used was -.21 to -.40.

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(1) The ranges shown are for ranges of transit mode share from 5-40 percent corresponding to travel times and prices over a 4 to 1 range.

One further calibration of a baseline model "constant" coefficient was made to be sure its predictions of changes conformed to replication of the current observed mode shares at Candlestick. This was also necessary to simplify the complex set of employment density variables in the M.T.C. model which were intended to account for varied social and recreational attributes of the destination. All of these were replaced by a constant which was calibrated on the observed current mode choices of San Francisco patrons to Candlestick Park, separately for baseball and football. The resulting model was then used to predict mode shares for all the sectors.

This simplified model for the proportion of people choosing transit (versus auto) mode is:

$$P^{T}_{jD} = (1 + \exp(\Delta U^{AT}_{jD}))^{-1}$$

where:

P^{T}_{jD} = the proportion of patrons to attraction D from origin sector j who choose transit

$$\Delta U^{AT}_{jD} = a_o + \left(\frac{2.17}{HHSIZE_j} + .337\right) AUTOS/HH_j$$

$$- .0293\ (INC/HH_j)\ \ln\ (LOS^{A}_{jD}/LOS^{T}_{jD})$$

$$- .401\ (\$AUTO_{jD} - HHSIZE_j \times \$FARE_{jD})\quad ;$$

and

a_o = $-.404$ for football,

= $-.636$ for baseball,

$AUTOS/HH_j$ = auto ownership/household in sector j,

INC/HH_j = annual income/household in j (1975$year),

$LOS_{jD}{}^{m}$ = typical door-seat total travel time by mode M from sector j to stadium (walk + wait + ride),

$\$AUTO_{jD}$ = typical "out-of-pocket" one-way dollar cost of auto trip from sector j stadium (gas + maintenance + parking tolls), and

$\$FARE_{jD}$ = typical one-way dollar transit fare from sector j to stadium.

All dollar value are in 1982$, except income (1975$).

The model accounts for seven factors in mode choice: transit and auto level of service, costs for both modes, household sizes, auto ownership levels, and incomes. The times and costs in turn incorporate up to six components in their totals. The model does not separately predict bus and rail shares (it assumes travelers from each zone will use the fastest transit alternative). The results are the sum of bus and rail shares. It does not predict small share modes (walk, bike, taxi). These are expected to be about one percent of attendance, but are not accounted for. The club bus share is accounted for separately, later.

Figure 3 in Section III D of the main report graphically illustrates the form of the relationships in this logit prediction model. It also shows the weighted average of the predictions for the downtown stadium and the existing Candlestick transit share for Sunday football. Predictions with the model for all sectors for football and baseball events are shown in tables 4 and 5 of Section III D.

All these predictions also assumed total modal travel times equal to those in the off-peak period (from M.T.C. transportation network files for 1980).(1) An exception is that auto travel times have ten minutes for egress parking and walking time to the stadium for all trips (as opposed to six minutes for China Basin zone #381 in the M.T.C. files).

The four sets of predictions shown in Tables 4 and 5 of Section III D are for standard transit fares, i.e., no special service or fares, as at Candlestick. Predictions are 7-14 percent less than comparable downtown-oriented stadiums in Atlanta and Cleveland with their special transit services (see discussion in Section IIID). It is 11 percent over the transit experience in Oakland, with its good rail connection.

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(1) Use of the transit off-peak travel times needs further comment. It is intended to represent standard weekend transit service, with buses added to accommodate the demand (e.g., in contrast to express or special run service). Actually, considerable buses would have to be added in the Muni sector, departing considerably from off-peak service. However, the following probable conditions are consistent with use of off-peak values:

- o The San Francisco off-peak headways are already low: 6-8 minutes.
- o This is a "low fare (cost) alternative", so no wholesale elimination of transfers or provision of express service is implied.
- o Advantages due to better headways and some trend toward direct service may be offset by increases in congestion.

These assumptions risk some underestimate of transit shares.

Sensitivity Analysis of Predictions

There are many variables and uncertainties in the inputs to the prediction process. These include:

- site location
- transportation pricing data
- level of service data
- future trends in transportation data
- baseline (Candlestick) transportation data
- parameters of forecasting model

The following tables illustrate the effects of extreme differences in these variables on the probable transit share to a downtown stadium. Table B-3 shows the effects of extreme errors in the basic forecasting model parameters or input data.

The results are expressed as different transit shares that would occur from San Francisco origins, from East Bay origins, and for the total stadium (with club bus shares added). The first row numbers are a baseline for comparison - the values predicted previously for the expected scenario.

The first group of effects (model errors) are for changes in the basic assumptions of the models or their parameters which apply to the downtown stadium. These show results with the model parameters set at extreme values of the range indicated in Table A-3, which apply to forecasting recreational travel for similar transportation environments. Most of the effects are small, even for 50 - 100 percent changes in the parameters (e.g., using a model with 50 percent smaller elasticity of demand to transit cost). Of note is that the parameters do not effect San Francisco and suburban shares by the same amount or even direction. Some errors depend upon the relative difference of predictions from the calibration data shares (20% transit in this case) rather than the absolute shares.

The second group of effects are for possible errors in the input data. These sensitivities are higher - about 80 percent of the error in the data itself. At a maximum they change the absolute transit shares by 6 percent. The effects of errors in other input variables can be seen from equivalent changes in these variables in the scenario alternatives table discussed in the last section of this appendix.

TABLE A-3

EFFECT OF MODEL PARAMETERS AND DATA ERROR ON PREDICTED TRANSIT MODE SHARES

From San Francisco Origins to Sunday Football at Downtown Sites

PARAMETER ASSUMPTION OR ERROR	PERCENT TRANSIT SHARE FROM SAN FRANCISCO	FROM EAST BAY	APPROXIMATE TOTAL FOR STADIUM[1]
Base Prediction	44%	11%	28%
Model Errors:			
If LOS coefficient is low (LOS elast.: - .7 → -1.4)	43%	6%	25%
If transit cost coefficient is high (Cost elast.: -1.2 → -.6)	34%	14%	26.5%
If auto cost coefficient is low (cost elast.: -.83 → -1.66)	52%	20%	37%
Data Errors:			
If LOS^T[2] data is 35% high	53%	17%	34%
If LOS^T data is 35% low	37%	8%	24%

(1) Includes club bus share.

(2) Transit level of service.

All effects on model prediction are shown for one error at a time. However, their cumulative effect is not additive. It is best expressed by the variance of the sum of errors. The root of the variance for all the effects in Table A-3 (i.e., the standard error of the sum) is 4 percent, implying that the maximum range of the stadium transit shares with all their extreme errors together (not all the same sign) would be 24 - 32 percent at the expected scenario for football with $6.00 parking.

Effects of Different Transportation Scenarios:

Table A-4 shows the effects of changes in the assumed probable transportation prices, transit service, congestion, and stadium locations on the mode shares from San Francisco and total attendance. In addition to the expected Downtown Stadium scenario, the 1982 Candlestick shares are also shown for comparison. The transit shares are moderately sensitive to prices and transportation service levels, varying by as much as 8 percent less or 6 percent greater than the predicted 28 percent. However, the probable combination of changes in individual assumptions, such as shown in the last two rows, have very little effect. The last scenario would probably strain the model assumptions for trade-offs between modes. This scenario would also probably drive down overall attendance.

TABLE A-4

EFFECTS OF DIFFERENT TRANSPORTATION SCENARIOS ON PREDICTED TRANSIT MODE SHARES

Sunday Football at Sites 7 or 14

Scenario	Percent Transit from San Francisco	Percent Transit Approx. Total for Stadium(1)
Expected: Site 7 or 14 with $6.00 parking; off-parking fares	44%	28%
Comparison: Candlestick 1982: $4.00 parking, MUNI only transit @ $3.00	20%	13%
1. Site 5 at Expected data	42%	27%
2. Expected Scenario, but with all transit fares 66% higher	35%	20%
3. Expected Scenario, except parking = $8.00	53%	33%
4. Expected Scenario, except parking = $4.00	34.5%	23%
5. Expected Scenario, except all transit service levels 35-40% better	53%	34%
6. Combination of Scenarios 2 and 5	44%	27%
7. Combination of Scenarios 2 and 3	44%	27%

(1) Including Club bus shares at 80%.

5. ECONOMIC IMPACTS

The evaluation of economic impacts for a downtown stadium is parallel to the analyses undertaken for evaluating a stadium at Candlestick Park.

A. SCOPE

The scope of service for conducting an economic impact analysis of a new downtown stadium includes the following:

<u>Task 1:</u> Evaluate the economic impacts which would result from developing Candlestick Park as a commercial site.

<u>Task 2:</u> Determine the economic benefits of developing a multi-use sports facility at two downtown sites.

In order to evaluate these economic impacts, ERA conducted analyses similar to those outlined in the Candlestick evaluation.

B. DATA

All the data used in the economic impact analysis for a downtown stadium is the same as the data used in evaluating a stadium at Candlestick Park.

C. ALTERNATIVES

A new domed stadium in downtown has been evaluted for three different downtown sites. However, all of these sites are adjacent and in the opinion of the consultants will have essentially the same economic impacts in the immediate area. The primary differentiating factor is in the type of development which will occur at the unused site (Candlestick Park). For purposes of evaluating the alternative of a domed stadium in downtown, the following commercial development of Candlestick was assumed:

	1990	1992	1994
Gross Sq. Ft. Office	245,000	245,000	245,000
Gross Sq. Ft. Light Industrial	100,000	100,000	100,000
Dwelling Units	73	73	76

D. ANALYSIS

The analysis of economic impacts for a downtown stadium follows very closely the format used for analyzing economic impacts of a stadium at Candlestick Park. The "A" tables present information of the economic impacts which result from expenditures at a new downtown stadium site. The "B" Tables summarize the economic impacts which will result from expenditures in the nearby area. It should be noted that the per capita expenditures used during this analysis presumed that all of these expenditures will occur in the downtown area since the downtown stadium sites are all centrally located. The "C" Tables summarize all of the impacts which will result from the development of Candlestick Park if it no longer is used as a stadium site.

Induced Development

Induced development, as noted in the Candlestick analysis, is not an additional economic impact but refers to the mix of new construction versus existing establishments which receive the economic impacts. The amount of new development depends on many factors including public policy and aesthetic judgements regarding new versus old.

All of these factors tend to favor new induced development around a downtown stadium within San Francisco. Therefore, while it is not possible to predict the precise amount of new physical development in downtown, it is anticipated that a new stadium in San Francisco would result in considerable upgrading of the physical commercial development in the immediate area. This would be particularly true if a major new planned development, such as the Southern Pacific Mission Bay project, began to be developed concurrently with the development of a new stadium, in which case most new development would occur within this project.

Summary of Potential Economic Impacts from Developing a Downtown Stadium

The economic impacts which will result from the development of a new stadium in downtown San Francisco are sumarized in Table 6 for the representative year of 1994.

TABLE A-1
NEW DOMED STADIUM DOWNTOWN:ON-SITE
ATTENDANCE
(,000)

ATTENDANCE	1988										1998										2008
BASEBALL	1980	1815	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
FOOTBALL	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595
BASKETBALL	496	474	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451
CONS. SHOWS	0	200	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396
OTHER	230	230	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
TOTAL	3301	3314	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364

1) Attendance figure from "Future of Candlestick" study for New Domed Stadium Downtown.

2) The Warriors wew included in attendance figures as given in the "Future of Candlestick" study.

TABLE A-2
NEW DOMED STADIUM DOWNTOWN:ON-SITE
SALES AND ADMISSIONS TAX
(,000)

SALES																					
CONCESSIONS	1988										1998										2008
BASEBALL	10413	10014	9550	10021	10515	11034	11578	12148	12747	13376	14035	14727	15453	16215	17015	17853	18734	19657	20626	21643	22710
FOOTBALL	2100	2204	2312	2426	2546	2671	2803	2941	3086	3238	3398	3565	3741	3926	4119	4322	4535	4759	4994	5240	5498
BASKETBALL	1216	1219	1217	1277	1340	1406	1475	1548	1624	1705	1789	1877	1969	2066	2168	2275	2387	2505	2628	2758	2894
CONS. SHOWS	0	367	763	801	840	882	925	971	1019	1069	1122	1177	1235	1296	1360	1427	1497	1571	1649	1730	1815
OTHER	773	811	1007	1056	1108	1163	1220	1280	1344	1410	1479	1552	1629	1709	1793	1882	1975	2072	2174	2281	2394
TOTAL	14502	14615	14850	15582	16350	17156	18002	18889	19820	20798	21823	22899	24028	25212	26455	27759	29128	30564	32071	33652	35311
SALES TAX REVENUES																					
CONCESSIONS	145	146	148	156	163	172	180	189	198	208	218	229	240	252	265	278	291	306	321	337	353
ADMISSIONS TAX																					
BASEBALL	990	908	825	825	825	825	825	825	825	825	825	825	825	825	825	825	825	825	825	825	825
FOOTBALL	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298	298
BASKETBALL	248	237	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226	226
CONS. SHOWS	0	100	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
OTHER	115	115	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136
TOTAL	1651	1657	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682

1) Concessions re-estimated using attendance figures for domed Stadium downtown from Giants' study.

2) Other figures were calculated the same as the Candlestick pro-forma except as noted.

TABLE A-3
NEW DOMED STADIUM DOWNTOWN:ON-SITE
JOBS, PAYROLLS, AND
POSSESSORY INTEREST
(,000)

	1988										1998
JOBS											
STADIUM EMPLOYEES	50	50	50	50	50	50	50	50	50	50	50
PAYROLLS											
STADIUM EMPLOYEES	1751	1838	1928	2023	2123	2228	2338	2453	2574	2701	2834
PAYROLL TAXES	26	28	29	30	32	33	35	37	39	41	43
POSSESSORY INTEREST											
PRESENT VALUE OF REVERSION	15573	16897	18333	19892	21582	23417	25407	27567	29910	32452	35211
POSSESSORY INTEREST	164427	166365	168198	169908	171476	172880	174096	175098	175854	176333	176497
POSSESSORY INTEREST TAX	1957	1980	2002	2022	2041	2057	2072	2084	2093	2098	2100

										2008
JOBS										
STADIUM EMPLOYEES	50	50	50	50	50	50	50	50	50	50
PAYROLLS										
STADIUM EMPLOYEES	2973	3120	3274	3435	3605	3782	3969	4164	4370	4585
PAYROLL TAXES	45	47	49	52	54	57	60	62	66	69
POSSESSORY INTEREST										
PRESENT VALUE OF REVERSION	38204	41451	44975	48797	52945	57446	62328	67626	73375	79611
POSSESSORY INTEREST	176306	175713	174670	173119	170999	168241	164769	160497	155333	149172
POSSESSORY INTEREST TAX	2098	2091	2079	2060	2035	2002	1961	1910	1840	1775

1) Possessory Interest was calculated using the indirect method. The Present Value of the reversion (total cost of stadium/(1 + Discount Rate)^N); where N is remaining years on lease) is subtracted from the total cost of the stadium (land value and construction cost) to derive the possessory interest for each year over the life of the lease. Next a compounded inflation factor of two percent was accounted for each year, on the Possessory Interest.

2) Discount rate is 8.5 percent; length of lease is 30 years; total cost is taken at estimated 180 million in 1988 dollars.

TABLE A-4
NEW DOMED STADIUM DOWNTOWN:ON-SITE
SUMMARY OF IMPACTS OF
ON-SITE EXPENDITURES
(,000)

	1988										1998										2008
SALES TAX	145	146	148	156	163	172	180	189	198	208	218	229	240	252	265	278	291	306	321	337	353
ADMISSIONS TAX	1651	1657	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682	1682
POSSESSORY INTEREST TAX	1957	1980	2002	2022	2041	2057	2072	2084	2093	2098	2100	2098	2091	2079	2060	2035	2002	1961	1910	1848	1775
PAYROLL TAX	26	28	29	30	32	33	35	37	39	41	43	45	47	49	52	54	57	60	62	66	69
TOTAL	3778	3810	3861	3890	3918	3944	3969	3991	4011	4029	4043	4054	4060	4062	4058	4049	4032	4008	3975	3933	3879
JOBS(FTE)	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
PAYROLLS	1751	1838	1928	2023	2123	2228	2338	2453	2574	2701	2834	2973	3120	3274	3435	3605	3782	3969	4164	4370	4585

TABLE B-1
NEW DOMED STADIUM DOWNTOWN:OFF-SITE
ESTIMATED ATTENDANCE AND
CHARACTERISTICS OF ATTEDANCE
(,000)

TOTAL ATTENDANCE	1988										1998										2008
BASEBALL	1980	1815	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650	1650
FOOTBALL	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595	595
BASKETBALL	496	474	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451	451
CONS SHOW	0	200	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396	396
OTHER	230	230	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
TOTAL	3301	3314	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364	3364
NUMBER OVERNIGHT																					
BASEBALL	139	127	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
FOOTBALL	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
BASKETBALL	16	15	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
CONS SHOW	0	6	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13
OTHER	7	7	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
TOTAL	221	215	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211	211

1) Total attendance figures were used, to reflect higher visitation to retail establishments in San Francisco area and attendance figures changed to those given in Giants' study for Candlestick.

2) The rest of the tables are calculated on the same assumptions as in the "B" tables for Domed Candlestick scenario.

3) 49'ers attendance was adjusted upward, to reflect greater seating to 59,500 per game, and Warriors were add in.

TABLE B-2
NEW DOMED STADIUM DOWNTOWN:OFF-SITE
ESTIMATED TOTAL EXPENDITURES
(,000)

PER CAPITA EXP.	1988										1998										2008
REST.	8.01	8	9	9	10	10	11	11	12	12	13	14	14	15	16	16	17	18	19	20	21
RETAIL	4.54	5	5	5	6	6	6	6	7	7	7	8	8	8	9	9	10	10	11	11	12
HOTEL	61.99	65	68	72	75	79	83	87	91	96	100	105	110	116	122	128	134	140	147	155	162
TOTAL	75	78	82	86	90	95	99	104	110	115	121	127	133	139	146	153	161	169	177	186	195
TOTAL EXPENDITURES																					
REST.	26436	27848	29662	31125	32659	34269	35959	37731	39592	41543	43592	45741	47996	50362	52845	55450	58184	61052	64062	67220	70534
RETAIL	14980	15781	16809	17637	18507	19419	20377	21381	22435	23541	24702	25920	27198	28538	29945	31422	32971	34596	36302	38091	39969
HOTEL	13719	14015	14387	15097	15841	16622	17441	18301	19203	20150	21143	22186	23279	24427	25631	26895	28221	29612	31072	32604	34211
TOTAL	55136	57644	60858	63858	67007	70310	73776	77414	81230	85235	89437	93846	98473	103327	108421	113766	119375	125260	131436	137915	144715

TABLE B-3
NEW DOMED STADIUM DOWNTOWN:OFF-SITE
ESTIMATED SALES TAX
(,000)

SALES TAX	1988										1998										2008
RESTURANT	264	278	297	311	327	343	360	377	396	415	436	457	480	504	528	554	582	611	641	672	705
RETAIL	150	158	168	176	185	194	204	214	224	235	247	259	272	285	299	314	330	346	363	381	400
HOTEL	1338	1366	1403	1472	1544	1621	1701	1784	1872	1965	2061	2163	2270	2382	2499	2622	2752	2887	3030	3179	3336
TOTAL	1752	1803	1867	1960	2056	2158	2264	2375	2493	2615	2744	2880	3022	3171	3327	3491	3663	3844	4033	4232	4441

TABLE B-4
NEW DOMED STADIUM DOWNTOWN:OFF-SITE
ESTIMATED JOBS AND PAYROLLS
(,000)

AMOUNT OF EXPENDITURES TO LABOR-PAYROLLS	1988										1998										2008
	----										----										----
RESTURANT	9041	9524	10145	10645	11169	11720	12298	12904	13540	14208	14908	15643	16414	17224	18073	18964	19899	20880	21909	22989	24123
RETAIL	2097	2209	2353	2469	2591	2719	2853	2993	3141	3296	3458	3629	3808	3995	4192	4399	4616	4843	5082	5333	5596
HOTEL	4651	4751	4877	5118	5370	5635	5913	6204	6510	6831	7168	7521	7892	8281	8689	9117	9567	10039	10533	11053	11598

TOTAL	15789	16485	17375	18232	19130	20074	21063	22102	23191	24334	25534	26793	28114	29500	30954	32480	34082	35762	37525	39375	41316
OPERATING JOBS (FTE)																					
RESTURANT	1075	1079	1149	1206	1265	1327	1393	1462	1534	1609	1689	1772	1859	1951	2047	2148	2254	2365	2482	2604	2732
RETAIL	160	160	171	179	188	197	207	217	228	239	251	263	276	290	304	319	335	351	369	387	406
HOTEL	377	367	377	396	415	436	457	480	503	528	554	581	610	640	672	705	740	776	814	854	896

TOTAL	1611	1606	1697	1780	1868	1960	2057	2158	2265	2376	2494	2616	2745	2881	3023	3172	3328	3492	3664	3845	4035

TABLE B-5
NEW DOMED STADIUM DOWNTOWN:OFF-SITE
ESTIMATED PAYROLL TAX
(,000)

PAYROLL TAX	1988										1998										2008
RESTURANT	136	143	152	160	168	176	184	194	203	213	224	235	246	258	271	284	298	313	329	345	362
RETAIL	31	33	35	37	39	41	43	45	47	49	52	54	57	60	63	66	69	73	76	80	84
HOTEL	70	71	73	77	81	85	89	93	98	102	108	113	118	124	130	137	144	151	158	166	174
TOTAL	237	247	261	273	287	301	316	332	348	365	383	402	422	442	464	487	511	536	563	591	620

TABLE B-6
NEW DOMED STADIUM DOWNTOWN:OFF-SITE
ESTIMATED NEW PROPERTY
TAX REVENUES
(,000)

CAPITALIZED VALUE OF NET RENTAL INC	1988										1998										2008
RESTURANT	30842	32490	34606	36312	38102	39981	41952	44020	46190	48467	50857	53364	55995	58755	61652	64691	67881	71227	74739	78423	82290
RETAIL	17976	18937	20170	21165	22208	23303	24452	25657	26922	28250	29642	31104	32637	34246	35934	37706	39565	41515	43562	45710	47963
HOTEL	57164	58396	59947	62902	66003	69257	72672	76254	80014	83958	88097	92441	96998	101780	106798	112063	117587	123384	129467	135850	142547
TOTAL	105982	109823	114723	120379	126314	132541	139075	145932	153126	160675	168596	176908	185630	194781	204384	214460	225033	236127	247768	259983	272800

NEW PROPERTY TAXES

RESTURANT	367	377	402	422	443	464	487	511	537	563	591	620	650	683	716	751	789	827	868	911	956
RETAIL	214	220	234	246	258	271	284	298	313	328	344	361	379	398	417	438	460	482	506	531	557
HOTEL	680	678	696	731	767	805	844	886	929	975	1023	1074	1127	1182	1241	1302	1366	1433	1504	1578	1656
TOTAL	1261	1276	1333	1398	1467	1540	1616	1695	1779	1867	1959	2055	2156	2263	2374	2491	2614	2743	2878	3020	3169

TABLE B-7
NEW DOMED STADIUM DOWNTOWN:OFF-SITE
TOTAL NEW TAX REVENUES
(,000)

TAX REVENUES	1988										1998										2008
SALES TAX	1752	1803	1867	1960	2056	2158	2264	2375	2493	2615	2744	2880	3022	3171	3327	3491	3663	3844	4033	4232	4441
PAYROLL TAX	237	247	261	273	287	301	316	332	348	365	383	402	422	442	464	487	511	536	563	591	620
PROPERTY TAX	1261	1276	1333	1398	1467	1540	1616	1695	1779	1867	1959	2055	2156	2263	2374	2491	2614	2743	2878	3020	3169
TOTAL TAXES	3250	3326	3461	3631	3810	3998	4195	4402	4619	4847	5086	5337	5600	5876	6166	6469	6788	7123	7474	7843	8229

TABLE C-1
NEW DOMED STADIUM DOWNTOWN:UNUSED SITE
PROPERTY TAX REVENUE
(,000)

OFFICE	1988										1998										2008
AMOUNT OF DEVELOPMENT			196		196		196														
LEASE RATE $/SF NNN	0.00	0.00	28.01		30.84		33.96														
TOTAL LEASE REVENUE	0	0	5490		6045		6656														
PROPERTY VALUE @ 11% CAP RATE	0	0	49910	50909	106880	109017	171702	175136	178639	182212	185856	189573	193365	197232	201177	205200	209304	213490	217760	222115	226558
TAXES @ . 0119%	0	0	594	606	1272	1297	2043	2084	2126	2168	'2212	2256	2301	2347	2394	2442	2491	2541	2591	2643	2696
LIGHT INDUSTRIAL																					
AMOUNT OF DEVELOPMENT			80		80		80														
LEASE RATE $/SF NNN	0.00	0.00	5.88		6.48		7.13														
TOTAL LEASE REVENUE			471		518		570														
PROPERTY VALUE @ 11% CAP RATE	0	0	4278	4364	9161	9344	14717	15012	15312	15618	15931	16249	16574	16906	17244	17589	17940	18299	18665	19038	19419
TAXES @ .0119%	0	0	51	52	109	111	175	179	182	186	190	193	197	201	205	209	213	218	222	227	231
HOUSING																					
AMOUNT OF DEVELOPMENT			73		73		76														
PROPERTY VALUED @ AVG PRICE OF	0		203		224		246														
TOTAL PROPERTY VALUE	0	0	14892	15597	33571	35159	56525	59199	61999	64931	68003	71219	74588	78116	81811	85680	89733	93977	98423	103078	107954
TAXES @.0119	0	0	177	186	399	418	673	704	738	773	809	848	888	930	974	1020	1068	1118	1171	1227	1285
TOTAL TAXES	0	0	822	843	1780	1827	2891	2967	3046	3127	3210	3297	3386	3478	3573	3671	[illegible]	3877	3985	4096	4212

1) Office space at 588,0000 square feet of development was phased in at 169,000 square feet at a time in 1990, 1992, 1994.

2) All the rest of the calculations the same as with office space for Domed Candlestick Tables C.

3) Two hundred and forty thousand square feet of light industry was phased in 80,000 square feet at a time, in the years 1990, 1992, and 1994.

4) The phasing in of light industry as a part of the taxable property base is the same as with office space.

5) Housing property value is the median condominium price of a newly developed ($145,000). The housing price was then multiplied by number of dwelling units to estimate total housing property value.

6) A total of 220 dwelling units were phased in at approximately 73 units at a time, in 1990, 1992, and 1994.

TABLE C-2
NEW DOMED STADIUM DOWNTOWN:UNUSED SITE
SALES TAX
(,000)

HOUSING

YEAR	1988										1998										2008
RESIDENTS	0		169		337		512														
ANNUAL EXPENDITURES ON TAXABLE ITEMS	10.69	11	12	12	13	13	14	14	15	16	16	17	18	18	19	20	21	22	23	24	[illegible]
TOTAL TAXABLE IN S.F	0	0	981	1023	2134	2226	3524	3676	3834	3999	4171	4350	4537	4732	4936	5148	[illegible]	5600	5841	[illegible]	[illegible]
TOTAL SALES TAX	0	0	10	10	21	22	35	37	38	40	42	44	45	47	49	51	54	56	58	61	64

1) Source: Sales Management Survey of Buying Power.

2) Total taxable sales is the number of residents multiplied by annual per capita expenditures non-taxable items.

3) Sales tax is 1 percent of total taxable sales.

4) Number of residents is figured at 2.3 per household as reported in "Sales Management Survey of Buying Power, 1982."

5) Residents shows the cumulative total resident at each period of phasing as more dwelling units are added. Note: this figure is not in (,000).

6) Annual expenditures inflated at 4.93 percent annually.

TABLE C-3
NEW DOMED STADIUM DOWNTOWN:UNUSED SITE
DEVELOPMENT, EMPLOYEES,
AND PAYROLLS
(,000)

OFFICE	1988										1998										2008
AMOUNT OF DEVELOPMENT			196		196		196														
TOTAL EMPLOYEES	0		0.78		1.57		2.70														
TOTAL PAYROLLS	0	0	32875	34496	72538	76114	124906	131063	137525	144305	151419	158884	166717	174936	183561	192610	202106	212070	222525	233495	245006
PAYROLL TAX	0	0	493	517	1088	1142	1874	1966	2063	2165	2271	2383	2501	2624	2753	2889	[illegible]	3181	3338	3502	3675
LIGHT INDUSTRIAL																					
AMOUNT OF DEVELOPMENT			80		80		80														
TOTAL EMPLOYEES	0		0.42		0.84		1.27														
TOTAL PAYROLL	0	0	13607	14278	29963	31440	44944	47160	49485	51925	54485	57171	59989	62947	66050	69306	72727	76308	80070	84018	88160
PAYROLL TAX	0	0	204	214	449	472	674	707	742	779	817	858	900	944	991	1040	1091	1145	1201	1260	1322

1) Light industrial figures are relatively the same as for office space except number of employees are derived on the basis of 23 per acre, and salaries are $24,000 per employee.

TABLE C-4
NEW DOMED STADIUM DOWNTOWN:UNUSED SITE
ECONOMIC IMPACTS FROM UNUSED SITE
(,000)

TAX REVENUES																					
YEAR	1988										1998										2008
SALES TAX	0	0	10	10	21	22	35	37	38	40	42	44	45	47	49	51	53	56	58	61	64
PROPERTY TAX	0	0	822	843	1780	1827	2891	2967	3046	3127	3210	3297	3386	3478	3573	3671	3772	3877	3985	4096	4212
PAYROLL TAX	0	0	697	732	1538	1613	2548	2673	2805	2943	3089	3241	3401	3568	3744	3929	41[illegible]	4326	4539	476[illegible]	4997
TOTAL TAX REVENUES	0	0	1529	1585	3339	3462	5474	5677	5889	6110	6341	6581	6832	7093	7366	7651	794[illegible]	8258	858[illegible]	892[illegible]	[illegible]
JOBS	0		1		2		4														
PAYROLLS	0	0	46482	48773	102501	107554	169850	178224	187010	196230	205904	216055	226706	237883	249611	261917	2748[illegible]	288378	302595	31751[illegible]	[illegible]

Table 6

SUMMARY OF ECONOMIC IMPACTS
FROM A DOWNTOWN SITE
(Millions of $ - 1994)

	Downtown Stadium Site
Direct	
A. From Stadium Operation	
Taxes (payrolls; concessions)	$.215
Possessory Interest Tax	$2.072
Admissions Tax	$1.682
Total City Revenues	$3.969
Expenditures	$18.002
Jobs (FTE)	50
Payrolls	$2.338
B. In Nearby Area	
Taxes	$4.195
Expenditures	$73.776
Jobs (FTE)	2,057
Payrolls	$21.063
Total for San Francisco	
Taxes	$6.092
Possessory Interest Tax	$2.072
Expenditures	$91.778
Jobs (FTE)	2,107
Payrolls	$23.401
Indirect	
C. At Unused Site	
Taxes	$5.474
Expenditures[1]	$3.524
Jobs (FTE)	4,000

[1]Taxable expenditures in San Francisco by on-site residents.

6. FINANCING

A. SCOPE

The scope of this task is to analyze alternative methods of financing and to develop a comparison of the relative costs and benefits of each and the risks and financial exposure of the City attributable to them.

B. DATA

The cost data used in the analysis was provided by Barton-Malow and Williams and Burrows, Inc., as verified and escalated by Lee Saylor, Inc. Alternative methods of financing have been selected from among those used by San Francisco in the past and those utilized by political subdivisions throughout the country or suggested by investment banking firms as being in compliance with existing Internal Revenue Service regulations and rulings and appropriate under the circumstances. Included in the latter category are reports to the San Francisco Giants as indicated below:

Reports:

1. Analysis of Financing Methods for San Francisco Sports Stadium. Salomon Brothers, Inc July 1982

2. San Francisco Giants Financial Analysis for Proposed Stadium. Smith, Barney, Harris, Upham and Co., Incorporated, February 25, 1983 (Revised March 23, 1983).

3. San Francisco Stadium Project. Kidder, Peabody & Co., Incorporated, April 16, 1983.

4. Letter from Merrill Lynch Leasing, Inc. on proposed lease financing for a new Sports Stadium in San Francisco, April 29, 1983.

5. ..."proposed financing of a new sports complex or the doming of Candlestick Park". A proposal from Shearson/American Express, Inc., May 3, 1983.

Interviews:

1. Gordon Swanson, Vice President, Eastdil Realty, May 1983.

C. ALTERNATIVES

Five financing alternatives have been analyzed as affording the opportunity to implement, in whole or in part, any decision by the City to build a new downtown stadium. These alternatives include traditional techniques which usually provide 100% tax exempt debt financing as well as more esoteric forms which involve private sector participation. These alternatives are described below.

Alternative 1: Lease Revenue Bonds

This financing technique was used for Candlestick Park (through San Francisco Stadium, Inc.) and for the Moscone Convention Center (through the Redevelopment Agency). This type of financing must be approved by a majority of the voters under the Charter. Bonds would be issued by the Redevelopment Agency or a non-profit corporation. Debt service for the bonds would be lease payments by the City from its General Fund. Bond proceeds would be used to finance debt service during construction.

Alternative 2: Private Sector Ownership

Under this alternative a major corporation would own and operate the stadium. The City would issue lease revenue bonds to provide for the project costs, but the owner would be primarily responsible for payment of bond debt service. It may even be possible to arrange the transaction so that the owner would not only contribute equity toward the project cost but would be exclusively responsible for debt service and the City would have no liability for the bonds. The owner would receive the tax benefits of ownership (depreciation, interest deduction and investment credit), as well as the public relations value of ownership, and as owner would receive any operating profits from the stadium. The City would hold an option to purchase the stadium for a nominal sum at a distant date. This type of financing must be approved by a majority of the voters under the Charter.

Conventional mortgage financing would also be available to the private sector owner but would cost more than the use of lease revenue or industrial development bonds.

Alternative 3: Sale-Leaseback Financing

This technique involves the sale or transfer of tax benefits (depreciation and interest), which cannot be used by the City, to the private sector which can use such benefits to shelter income. The City would operate the stadium under

this alternative. This type of financing must be approved by a majority of the voters under the Charter.

The City would purchase the facility at expiration of the lease term at its then fair market value.

The sale-leaseback alternative is a highly complex and technical undertaking involving substantial tax and securities laws questions. This is a rapidly evolving area and tax laws, Internal Revenue Service rulings or governing case law could be changed at any time and preclude consummation of such a transaction.

The City's participation in a financing of this type would typically involve issuance of tax-exempt bonds, such as lease revenue bonds described earlier, in such an amount as would, together with the proceeds from the sale of the tax benefits, equal construction and financing costs. The sale of tax benefits, often called the equity contribution, can be expected to reduce project costs by approximately 20% or so, depending upon the structure.

Alternative 4: Community Facilities District Financing

With passage of Proposition 13, the authorization of new general obligation bonds has effectively been precluded. However, recent legislation, the Mello-Roos Community Facilities Act of 1982 (Section 5311 et. seq. of the Government Code), seemingly would permit financing of a new downtown stadium with bonds payable from a special tax imposed on other than an ad valorem basis if approved by two-thirds of the voters within the confines of the Community Facilities District.

Alternative 5: Tax Allocation Bonds

If the new stadium were to be located within an existing redevelopment project area or annexed thereto or situated within an area to be so designated, tax allocation bonds could be issued to pay all or a portion of financing costs. Such bonds, used by the City to finance the Davis Street BART Station, are payable from taxes collected upon the increase in assessed valuation within the redevelopment project area over the base year assessed valuation of the project area which is determined upon creation of the project.

D. ANALYSIS

The financing of a new downtown stadium by either the City or the private sector will depend in large measure upon the benefits perceived to be derived from such activity. If projected revenues are adequate to meet projected operating expenses, financing costs and provide a return on investment, both the City and the private sector probably would willingly participate in the ownership role.

A stadium, looked upon from the standpoint of a free-standing project, usually does not produce sufficient revenues from rentals, ticket surcharges and concession income to be self-supporting. Only when indirect revenues such as hotel taxes, sales taxes, parking fees and property taxes from induced development are included do most stadiums appear self-supporting.

Accordingly, the use of conventional revenue bonds, such as those issued by the City to finance expansion at San Francisco International Airport, is not feasible because revenues from the stadium do not appear adequate to cover debt service.

Lease revenue bonds commit moneys in the City's General Fund to cover the shortfall in revenues. Alternatively, private sector ownership and sale-leaseback financing utilize private sector capital and federal tax benefits to cover the projected shortfall in revenues. Tax allocation bonds commit increases in property taxes to cover the shortfall while a Community Facilities District issue would use a special tax for this purpose.

The sale or lease of luxury boxes may further reduce construction costs. This technique has been employed elsewhere with success. The details of such a plan, whether it be to lease or to condominiumize the boxes, would have to be worked out with the principal tenants since ticket or admission charges presumably would be in addition to the box cost. Because of the limited number of boxes suitable for such treatment, the sale or lease thereof would not of itself dictate the financing alternative to be utilized. Rather, any decision to pursue this technique would probably be compatible with any of the financing techniques available. Similarly, the sale of debt obligations coupled with an option to acquire season tickets for athletic events may help to reduce financing costs but cannot be expected to produce adequate funds to supplant other alternatives.

Although it might be difficult to obtain a favorable two-thirds vote on issuance of bonds supported by a special tax in order

to construct a new downtown stadium, the Community Facilities District Act affords an opportunity to raise funds with a broader base than just the projected direct and indirect revenues available to the City. Depending upon the geographical limits of the District and the basis for imposition of the special tax, significant relief could be provided to the City's General Fund.

The use of tax allocation bonds to finance public improvements within California has been widely accepted for many years. Its application, however, is limited to those redevelopment project areas where substantial private sector development has occurred or is occurring causing increases in assessed valuation sufficient to produce tax revenues in amounts capable of servicing the indebtedness incurred. In the case of a new stadium, it is doubtful that the entire financing requirements of the proposed construction could be raised in this manner, but should the site of the new stadium be included within a redevelopment project area, this financing technique affords the opportunity to raise funds payable from property taxes collected upon any increase in assessed valuation within the redevelopment project area. Through a reimbursement agreement between the City and the Redevelopment Agency, such tax revenues might also be used to reimburse the City for any lease rental payments made to support lease revenue bonds issued by the Redevelopment Agency for the new stadium.

Total financing costs for each of the alternatives involving City participation include estimated design and administration costs at 15% of construction expense, construction, costs of bond issuance, funded interest during the construction period and establishment of a reserve for debt service as appropriate, and provision for a discount bid or debt service insurance as indicated. The period for which interest is funded is dependent upon the time frame from commencement of construction to completion thereof. Alternative construction schedules have been provided involving the design/bid/build process and a phased design/bid/build scenario. The latter should result in a completed facility considerably sooner than the more conventional design/bid/build process but poses more difficult financing considerations such as the imposition of liquidated damages for failure to complete in a timely manner, provision of labor and material and performance bonds and certainty as to costs at the time the bond issue is sized.

The Task Force Team has studied several sites and designs for the proposed new stadium and a composite average of the costs thereof has been selected to illustrate the probable costs for the financing methods described above. The estimated construction cost of $102.0 million has been escalated 5.3% to a June 1984 figure resulting in an estimated construction cost of $107.4 million. Shown in the table following are the estimated bond issue sizes required to finance this cost assuming a 9.5% borrowing rate for 25-year lease revenue bonds and a 9% rate for a Community Facilities District offering.

Interest is funded for a period of 36 months for the lease revenue bond issue on the assumption that bonds would not be sold until either the fixed cost or maximum cost of construction is determined (either 15 months or 5 months from the order to proceed depending upon whether the design/bid/build or the phased design/bid/build process is utilized). A debt service reserve equal to maximum annual debt service is also provided. Because the City cannot legally commence rental payments until construction is substantially completed and the City has the beneficial use thereof, it is necessary to fund interest during the construction period for lease revenue bonds. For the Community Facilities District issue, however, the special tax could be imposed immediately so only a reserve fund is provided to cover cash flow concerns. Recent Internal Revenue Service letter rulings require that investment income during the construction period be taken into account in sizing the respective bond issues. This has been done at rates varying from 8% to 10.5% depending upon the particular funds invested. In the absence of tax revenues adequate to support a tax allocation bond issue for the cost of a new stadium, no issue size has been calculated for this financing method.

(in thousands)

Item	Lease Revenue Bonds	Sale-Leaseback	Community Facilities District
Construction cost	$107,400	$107,400	$107,400
Design & administration	16,110	16,110	16,110
Sub-total	$123,510	$123,510	$123,510
Less:			
Investment income	26,668	21,339	18,472
Equity contribution(20'	--	24,702	--
Sub-total	$ 96,842	$ 77,469	$105,038
Funded interest (3 years)	47,880	38,333	--
Bond reserve fund	17,808	14,257	12,359
Discount/issuance (3%)	5,040	4,035	3,642
Issuance expense	350	350	300
Bond issue size (rounded)	$168,000	$134,500	$121,400

The annual debt service requirements for each issue are the same as the amount of the bond reserve fund deposit.

For the 25-year period of debt service payments, the City's aggregate obligation for each of these alternatives is calculated to be as follows, assuming application of the reserve fund to the final payment:

Lease Revenue Bonds	$427,392,000
Private Sector Ownership and Sale-Leaseback Financing	$342,168,000
Community Facilities District	$296,616,000

Any financing of a new stadium would have to include provisions for defeasing or retiring the outstanding bonds of San Francisco Stadium, Inc. issued to finance Candlestick Park. An allowance has been included in the costs of the new stadium to demolish Candlestick Park and it is assumed that the sale or other disposition of the site will produce sufficient income to accomplish such defeasance or retirement.

The relative advantages and disadvantages of the financing alternatives are summarized in the comparisons which follow:

Advantages	Disadvantages
1. Lease Revenue Bonds	
A. Requires only a simple majority vote of the electorate	A. Must fund interest during construction, increasing issue size
	B. May pose Proposition 4 appropriations limit problem
	C. City is solely at risk for debt service
	D. Should have construction bids in hand to size issue, determine rent
2. Private Sector Ownership	
A. Requires only a simple majority of the electorate	A. Private owners may be difficult to locate
B. Affords reduction and possible elimination of financial exposure of the City	

Advantages	Disadvantages
3. Sale-Leaseback Financing	
A. Requires only a simple majority vote of the electorate	A. Complex tax and legal process
B. Affords some reduction in financial exposure of the City because of equity contributions	B. Lower than usual assurance of success
4. Community Facilities District	
A. Least costly method	A. Requires two-thirds vote of District electorate
B. Broadens base of revenue support	B. May require court validation action because of newness of statute
5. Tax Allocation Bonds	
A. No vote required, only Board of Supervisors/Redevelopment Agency approval	A. Needs substantial private sector investment to produce requisite increase in assessed valuation

7. PUBLIC OPINION

A. SCOPE

Included in this study, is the identification of the questions, concerns, doubts and potential support and/or opposition to a new stadium facility located South of Market.

We used secondary data research methods which include the analysis of existing studies, press clippings, letters to concerned parties or individuals, and the eliciting of response to the proposed project from community groups and leaders, concerned organizations and developers with proposed projects nearby or adjacent to the stadium site study area.

B. DATA

When the downtown site selection process had been completed and the proposed stadium study area defined, we identified those groups which would be impacted by a stadium project or would represent potential support or opposition to a project.

COMMUNITY GROUPS

South of Market Alliance

Development in the South of Market area has a history of controversy, and the first group we met with was the South of Market Alliance. The Alliance is a group of community action organizations who originally banded together to oppose development of the Yerba Buena Center. In light of new development proposed for the South of Market Area such as, Mission Bay, South Beach, Showplace Square, a downtown stadium and the continued development of the Yerba Buena Center, the Alliance is stepping up their reorganization efforts to be an effective community voice.

We were invited to attend a general board meeting to discuss their concerns regarding a stadium facility in the South of Market Area. Board Members represent the following South of Market groups:

St. Joseph's Parish Council
Fil-Am Senior Citizens Society of San Francisco
West Bay Filipino Multi-Service Corp.
Canon Kip Community House
Community Action
Tenants and Owners Development Corporation (TODCO)
South of Market Food Coop
D. Art
Cebu Association of California, Inc.
Citizens for Representative Government

The group is quite vocal and demonstrated many concerns about a downtown stadium and its cumulative impact with existing and proposed development in the South of Market. As opposed to the Candlestick Park community, the Alliance did not have the experience of a stadium in their neighborhood, and therefore could not state concerns regarding direct impacts. Their concerns were expressed in the form of questions, some of which are answered or addressed in the scope of this study. Others would require a study with the depth of an Environmental Impact Report. The areas of concern fall into seven general categories and are presented here in the form of questions raised at our meeting.

Traffic and Transit

1. How many parking spaces will be required for a stadium?

2. How will stadium traffic impact the business commute?

3. How will stadium traffic affect cumulative traffic impacts?

4. How can the amount of parking required to serve a stadium be attractive?

General

1. Why a new stadium? Why spend time and money on a stadium study?

2. Is the downtown stadium in keeping with national trends?

3. Who will use the facility -- residents or non-residents?

4. What other uses would a new stadium be put to? What impact would those uses have on surrounding areas?

5. What will be the nature of public participation in the decision making process?

6. What is the time frame for a new stadium if one is to be built?

South of Market

1. What will be the impact of a stadium on South of Market seniors? (Crime, emergency vehicle access, etc.)

2. How will a new stadium in South of Market affect the surrounding area as compared to what we know has happened at Candlestick Park? (e.g., traffic and public transit impacts, land values, crime, pollution, etc.)

3. If Candlestick Park has a negative impact on Hunters Point, why move it South of Market where it will have an equal if not greater impact?

4. How will a stadium affect the fabric of the present neighborhood?

Candlestick

1. Who pays for the demolition costs of Candlestick Park?

2. What needs to happen at Candlestick Park to make it an asset to the area?

Planning and Zoning

1. How does a new stadium relate to the City's master plan?

2. Is there time, attention and money being spent to address other important issues? (e.g., housing, unemployment.)

3. Are the cumulative impacts of all South of Market developments being addressed?

4. Is any re-zoning going to be required?

Economic

1. How would improvements to Candlestick Park or a new facility be financed?

2. If the financing plan requires a private sponsor for an interim period of time ... will the City eventually inherit an obsolete structure?

3. Will the financial plan be similar to the Oakland Museum Plan which ended in disaster?

4. Why don't professional sports teams build their own stadium?

5. Is it reasonable and economically feasible for a City to own its own sports team?

6. How would a stadium affect land values in the area?

7. What will a new stadium cost?

Mission Bay

1. Mission Bay project assumption: Does a new stadium assume the existence of a Mission Bay project as proposed?

2. Will the City make concessions on Mission Bay to expedite a stadium project?

3. If the Mission Bay project is delayed and parking structures are not built, how would this affect a new stadium?

4. Will the City extract public benefits from Southern Pacific on Mission Bay in addition to the land for a stadium?

5. How can a stadium be planned to relate to Mission Bay when we don't yet know for sure what will be built there?

6. Is the Mission Bay project dependent on the stadium?

7. Would the stadium be a financial benefit to the Mission Bay project?

8. Would a stadium diminish the size of a Mission Bay project?

South of Market Consortium

The South of Market Consortium is a group of health care professionals, senior service suppliers, owners and managers of senior housing units and senior residents of the housing projects. Members includes representatives from the following agencies and organizations:

San Francisco General Hospital
Health Center, No.4 Department of Public Health
Community Rehabilitation Workshop
VISTA-Sheriff's Department Housing
Northeast Mental Health Center
S.A. Senior Activities Center

Silvercrest Residence
SF Housing Authority
Mt. Zion Hospital, Senior Health Screening
Legal Assistance To The Elderly
North of Market Planning Coalition
South of Market Alliance
North of Market Senior Center
Woolf House Residents Association
Salvation Army Social Services
Senior Escort Program of South of Market
Alexis Apartments
Tenants and Owners Development Corporation
Salvation Army Senior Center
Dismasalang House
South of Market Health Center
Visiting Nurse Association
Gray Panthers
Meals on Wheels
Canon Kip
San Francisco Redevelopment Agency
Community Services Representative,
  SF Departmet of Social Services
South of Market Grocery
St. Patrick's Church
San Francisco Police Department-Southern Station
Community Relations, Sheriff's Office
AT&T Long Lines

According to the South of Market Consortium, there are approximately 5,000 seniors living in and south of the Yerba Buena Center area.* One half of these seniors are over 70 years of age. A major concern of the consortium is that any development in the South of Market will have a detrimental impact on the resident seniors. In fact, they feel very strongly that the seniors are currently suffering from negative impacts brought about by the Moscone Convention Center. These negative impacts include:

Crime:

The consortium has been keeping records of crimes reported by residents, and indicated that since Moscone Center has opened

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*/ 1980 Census tract data shows that there are 1,987 residents age 65 or over, or 16.7% of the total residents (11,911) in an area bounded by The Embarcadero, Market Street, South Van Ness Avenue and Mariposa Street. (Census tracks 176.01, 176.02, 178, 179.01, 180, 177 and 607.)

there has been an increase in senior muggings and purse snatching, and that crimes previously alien to the neighborhood such as car theft and break-ins are now occuring.** They expressed dissatisfaction with Moscone Center security, which combs the neighborhood for a two block radius that stops at Folsom Street. They feel that Moscone Center security is only interested in preventing theft break-ins or molestations of facility users, and does little to protect neighborhood residents.

They also feel that the street grid of the South of Market with its many narrow alley ways creates an atmosphere conducive to group or gang type crimes, which have been experienced in the the Candlestick Park area during game times.

Traffic/Parking

The consortium feels that traffic is already a problem in the area, and that the introduction of a stadium would only intensify the situation. Present traffic from downtown and Moscone Center have created a problem for emergency vehicle access. Many of the Senior Housing Projects have entryways in the small alleys off main corridors. At present, small delivery trucks often block the alleys, and the situation is further exacerbated by illegal parking on streets where prohibited,or on sidewalks. Their feeling is that there is not enough existing police enforcement of parking violations, and that the addition of a stadium to the neighborhood would increase the number of violators and further block emergency vehicle access.

**/ The South of Market Consortium issued a "Street Report" of crimes in the Yerba Buena Center to City Chief Administrative Officer, Roger Boas, on November 8, 1982. The data was collected through questionnaires to residents, requests to housing managers and local businesses, and reflects all incidents, as opposed to "police reported" crimes. The report includes letters from ten South of Market organizations, reporting crimes, and stating the noticeable increase in crime since the opening of Moscone Center.

The San Francisco Police Department was contacted, but was unable to supply a comparison of crime figures before and after the opening of Moscone Center as of the time this study went to print.

Environment

They are concerned about the environmental effect of turning 3rd and 4th Streets into more intense traffic corridors. The concern is that development would ruin the efforts of those who are trying to make South of Market into a neighborhood. They also mentioned that the EIR for the Yerba Buena Center stated that development in the area would increase air pollutants on the 3rd-4th Street corridors. They feel that a stadium with its additional traffic would create a health hazard to resident seniors, many of whom already suffer from respiratory ailments. Aside from air pollution they mentioned a concern that increased traffic for a stadium would create a general increase in the debris problem.

Stadium Users

Finally, they mentioned that a stadium could bring an undesirable element of rowdy fans, and youth using senior bus routes, especially if a new stadium facility were used for non-sports events such as rock concerts.

Other concerns mentioned were:

- The visual impact the size of a stadium structure would have on the neighborhood
- Potential closing of the Recreational Vehicle Park
- That stadium serves only a small percentage of San Francisco residents.

They were most adamant that there is a need to study the environmental and social impacts a stadium would have on the South of Market -- a need to identify costs other than financial. They perceive the neighborhood to be residential in nature and gaining more housing units. The impacts on seniors and other South of Market residents must be considered, as many have no other choice of a place to live.

Mission Creek Conservancy

The Mission Creek Conservancy is an association of house-boaters, bird lovers and community individuals. The primary purpose of the association is to create a natural park at Mission Bay in an area that is part of the stadium study site (5,6). The group envisions the park as a natural open space environment rather than a formal park with concrete waterways. The group is currently meeting with Southern Pacific, community organizations and local government agencies to negotiate the park.

Potrero Hill Boosters and Merchants

We attended a meeting of the Potrero Hill Boosters and Merchants to learn their concerns regarding a downtown stadium located in the study area. The meeting was attended by 35-40 members, and they expressed their concern in the form of questions they hope will be answered before a downtown stadium decision is made, and statements of concern regarding potential impacts.

Traffic/Transit/Parking

1. Considering the traffic impact at Candlestick Park, why move the stadium downtown where impacts would possibly be more intensive?

2. In regard to parking ... what is "spill over"? How many fans could possibly park in the Potrero Hill area?

3. What happens to SP commuters, given that some of the possible sites would necessitate moving the terminal?

4. Is a stadium in that location a move to try and extend BART to the Peninsula?

5. Compared to the size of Candlestick Park, including the parking lots, how can a stadium with no dedicated parking be feasible?

6. Have any studies been made of other cities with downtown stadiums in regard to parking?

7. Traffic and parking are major concerns ... what happens if events coincide with commute traffic?

8. Would stadium parking have to be shared with the Mission Bay Project?

9. How can the City seriously consider a site with no parking?

10. Wouldn't "Monday Night Football" be a disaster?

11. Can the teams schedule their games, so stadium traffic won't impact commute traffic?

12. What about the impact of weekend games with transit/ traffic on the Embarcadero? It's already a problem, and tourism has been down in the last 2 years.

Environmental

1. Would we (residents of Potrero Hill) be able to hear the crowds at a downtown stadium?

2. Will the size of the stadium block views? Is it a painted structure or concrete? The China Basin building already stands out -- this project will be even more massive.

3. Won't the influx of additional automobiles create more air pollution?

4. What about the lighting of night games ... will the kleig lights be a problem for Potrero Hill residents?

Social

1. Where are people going to tailgate?

2. How many people come to events from S.F., and how many from other areas? Is a stadium really an asset to the residents of San Francisco?

3. The question, is economic and social benefit to the City ... should we spend as much time and money developing facilities that benefit children as well as adults?

4. Is baseball a continuing sport, or will high salaries force teams to fold?

5. The social impacts of this project need to be considered.

6. With more people coming into the area, will crime increase during game times? In general?

Candlestick Park

1. Considering the crime and weather at Candlestick, it was not the right decision. A downtown stadium would be an alternative if all the intricacies and problems can be worked out.

2. Candlestick Park doesn't bother anyone, it should be domed and left at its current location.

3. What would happen to Candlestick Park if a downtown stadium was to be buildt?

Design

1. Is the dome going to be removable or permanent?

2. Is the study taking into consideration the general aesthetic of the sport of baseball? How many fans want to watch games played indoors on carpet?

Financial

1. Who is going to pay for it?

2. What leads the City to believe that San Francisco has the constituency to pay for luxury boxes?

3. Is it true that the main reason the Giants and the City want to get rid of Candlestick Park is because there is no room to put in luxury boxes?

4. Is it possible a tax assessment would be necessary to pay for a new stadium?

Mission Bay

1. Would the land come from Southern Pacific?

2. How does Southern Pacific feel about the stadium?

3. Could a stadium on Southern Pacific land be a trade-off for building heights in the proposed Mission Bay project?

General

1. What are the assets/benefits to Potrero Hill residents by having a downtown stadium?

2. Who is sponsoring this study?

3. What are the alternate uses of a new domed stadium?

4. When is the study due?

5. Who gets to make the decision between a new downtown stadium and Candlestick Park?

6. Was the Hunter's Point shipyard site considered?

OTHER PROPOSED SOUTH OF MARKET DEVELOPMENT

A project with the proposed scope of a downtown stadium would necessarily impact the direction of other new development. We have met with groups involved with proposed developments

adjacent to the stadium study area; Mission Bay, South Beach, Showplace Square and the China Basin Building.

Showplace Square

A meeting was held with the designers of the proposed Showplace Square master plan and representatives of the Showplace, the Galleria Design Center and Bay West Development Company. Later we met with the general membership of the Showplace Square Association. The group had very definite concerns regarding the impact of a stadium on their proposed development.

Showplace Square would like to set itself up as a defined community, perhaps visually defining the boundaries by the use of entrance gate posts. They also stage various events at all times of the day and night as well as weekends. Their major concern is in the area of Traffic/Transit and Parking, especially the cumulative impact created by Showplace Square, Mission Bay, Moscone Center and a stadium.

They are concerned that they may create parking space for the convenience of their own clients, and have these spaces used by fans as the area is on the outer limits of a 15 minute walk from the stadium study site. There was also mention of the fear that the Showplace Square area would be used for tailgate parties.

Concern was expressed regarding the fate of I-280. Some feel that it should definitely steer traffic away from the Showplace Square area. In addition, they felt that attention should be given to roadway graphics for the stadium to lessen the impact of stadium traffic on the Showplace Square area. There is some concern about the use of local surface streets by fans coming to the stadium from the west.

Other concerns were the multiple use of the stadium for 300 or more events per year,and whether or not a downtown stadium would eventually downgrade the area.

Some of the members of the Association were in favor of the stadium, others decidedly opposed. The general feeling is that the area might be able to benefit from a downtown stadium, especially if it brought entertainment and restaurants to the area. However, they are quite concerned that the City make no decisions without adequate study of the cumulative impacts of all proposed development in the South of Market area, and want their interests and concerns to be considered in the decision making process.

South Beach

A meeting was held with the developers and attorneys for proposed housing development in the South Beach area, and was attended by representatives of Forest City Dillon; San Francisco South Bay; Campeau; and Tosta, Browning & Cincotta. Of all the proposed development adjacent to the stadium study site, the South Beach Developers feel their plans are closest to realization.

Of all the sites in the study area they would rank site 7 the least desirable, followed by site 14. Their preference would be for development of a stadium in sites 5 or 6. Their concern is that sites 7 and 14 for a stadium are not compatible with residential development. It was commented that if site 14 is approved and pursued as a stadium project then "South Beach is dead". Another concern is parking. If the Mission Bay development does not go forward, they feel South Beach would be providing "seek and find" free parking for fans. Their plans call for a residential community with pedestrian oriented streets and off-street parking.

They also mentioned concern about the ultimate destination and touchdown of I-280 and the potential of connecting it to the Embarcadero; that the Embarcadero may become a major thoroughfare serving the stadium and create a barrier between a South Beach residential development and the Bay.

Of primary concern was the decision-making process regarding a proposed downtown stadium. They feel that as long as a stadium proposal is in the works, but not definitely decided upon it will have an adverse impact on the image development, marketing and financing of an adjacent residential development. The proposed plans for South Beach development need to have approval from the San Francisco Redevelopment Agency by the end of 1983. Issues which need to be resolved before a stadium could be decided upon (such as the fate of I-280) could take 2-3 years. The feeling is that a wait of this term before a decision is made would kill any residential plans for the South Beach area. There is also the possibility that a stadium on site 14 could trigger the necessity of a new South Beach EIR, and new planning or another EIR for I-280.

San Francisco Redevelopment Agency

Members of the Stadium Task Force and Study Team met with Tom Conrad, Bob Issacson and Frank Cannazero of the San Francisco Redevelopment Agency. They expressed the following concerns:

1. SFRA can support a stadium on sites 14 or 5, but oppose selection of site 7 due to development of the South Beach housing projects.

2. Site 14 may have negative impacts on the South Beach projects requiring adjustments to their plans and these potential impacts must be further addressed.

3. The stadium should be perceived of as more than a functional sports arena ... a continuous activity center. The key is to incorporate it into a transportation center.

4. SFRA's tax increment method of financing should be considered as a means of financing a new stadium -- especially considering the proposed Mission Bay Project.

China Basin Building

The alternative of building a stadium on site 14 would directly impact the China Basin Building as it presently exists, and their approved project expansion of 180,000 square feet. Two meetings were held with representatives from Hanford Freund & Company and Whisler, Patri, the real estate representatives and architectural planners for the building. The result of the second meeting was a memo to the stadium task force and study team members outlining their concerns both positive and negative.

"The positive aspects of the preferred stadium site (14) and its relationship to the China Basin property are the following:

1. It could be an exciting project, the proximity of which would stimulate activity in the area.

2. There is the possibility of developing some creative urban design solutions for this mix of uses, including point towers at the four corners of the stadium.

3. Transportation access to the China Basin site would increase because of the need for it to service other activities. ("The stadium brings transit; transit is good for the project.")

4. Joint use parking could decrease the parking requirement for the project.

5. A liberal tradeoff attitude could increase the allowable square footage of the project. The towers could rise above the stadium."

"The following concerns which could have a negative effect on the project are:

1. The proximity of the stadium to the China Basin Building, especially the 40 foot cantilever could create a tunnel effect for the north facing windows up to 70 feet high.

There would be some more view blockage from the towers since the stadium must be 200+ feet high.

2. There would be loss of ground floor of the new towers to provide access to the stadium.

3. There would be considerable disruption for at least 2-3 years directly attributable to the stadium construction; perhaps more, including roadway construction and realignment and relocation of the sewer line.

4. It would be definitely disadvantageous for the China Basin project to be tied to the construction of the stadium in that it would not allow flexibility on behalf of the project sponsor.

5. With more activity would come more congestion and the probability of traffic jams unless the traffic and transport issues were successfully solved."

In addition, the China Basin Building representatives have the same concern as the South Beach Developers -- any decision they need to make in regard to their own proposed development would depend upon a "Go"-"No-Go" decision by the City on a specific stadium site.

Mission Bay-Southern Pacific

Members of the Stadium Task Force and Study Team met with the Design Consultants for Southern Pacific's proposed Mission Bay project. They expressed interest in cooperating with the City on a stadium in the study area and believe the project is feasible as well as challenging. Two additional meetings were held with representatives of Southern Pacific and the Stadium Task Force where possible integration of a stadium into the Mission Bay Project was discussed.

SAN FRANCISCO BUSINESS ORGANIZATIONS

Influential business organizations have either offered opinions regarding a proposed downtown stadium, or were asked for comments. The San Francisco Convention and Visitors Bureau Board of Directors unanimously endorsed a resolution supporting the development of a domed stadium south of Market Street on August 25, 1982.

"WHEREAS San Francisco has long been recognized as a North American sports capital and strong supporter of professional athletic competitions; and

WHEREAS San Francisco's reputation as a popular visitor destination and all-around metropolis providing a full spectrum of recreational activities has been enhanced by its standing as the hometown of the San Francisco Giants; and

WHEREAS the City has greatly benefitted from the international publicity accruing to it as the home of the World Champion San Francisco 49'ers, the oldest professional sports franchise in the West; and

WHEREAS a new, domed, multi-purposed stadium situated south of Market Street would provide a suitable home for the San Francisco Giants and 49'ers and, in addition, would accommodate all type of sports and consumer events, trade shows and rally-type assemblies as well as such special events such as the Super Bowl; and

WHEREAS such a facility has a projected utilization of 200 event days a year attracting a combined attendance of 3 million people to the center city, which would enhance San Francisco's restaurant, retail and hotel economy, and

WHEREAS it would complement the Moscone Convention Center and Yerba Buena Gardens project and contribute immeasurably to the economic revitalization of this important sector of the City; and

WHEREAS there appears to be available space South of Market readily accessible by freeway and all forms of public transit, including fixed rail and water; and

WHEREAS Candlestick Park has proved to be unsatisfactory as a team and spectator facility from the standpoint of accessibility, weather conditions and parking, and this 75-acre waterfront property could thus be freed for more appropriate utilization,

BE IT, THEREFORE, RESOLVED that the Board of Directors of the San Francisco Convention and Visitors Bureau does urge Mayor Feinstein and the Board of Supervisors to support the stadium project and to take all reasonable and appropriate measures to ensure its successful construction; and

BE IT FURTHER RESOLVED that the Board of Directors urges Bureau members to contact on an individual basis the Mayor and members of the Board of Supervisors to enlist their active support of the stadium project."

San Francisco Chamber of Commerce/Bay Area Council

The San Francisco Chamber of Commerce has not at this time devoted any study to a proposed downtown stadium. If the project were to be more closely realized, the Chamber may choose to study the issue and prepare a statement. The same is true of the Bay Area Coucil.

Downtown Association

At the present time, the Downtown Association does not endorse a South of Market stadium option over the revitalization and doming of Candlestick Park. However, the organization feels the facility at Candlestick is inadequate, and supports the position that some action needs to be taken.

Golden Gate Restaurant Association

On October 11, 1982, Rolf Lewis, President of the Golden Gate Restaurant Association made the following statements in a letter to Supervisor Quentin Kopp:

> "As the spokesman for the San Francisco Restaurant Industry, we would like to go on record with the Board of Supervisors of the City and County of San Francisco as favoring such an installation. We have a concern that to do nothing could cause the San Francisco Giants to leave San Francisco. The loss in employment and the effect on our industry concerns us greatly.
>
> We urge the Board of Supervisors to consider any feasible alternatives to Candlestick Park. Thank you for your attention."

Other Convention Facilities

We also interviewed Robert F. Begley, Manager of San Francisco Convention Facilities which include Moscone Center, Civic Auditorium and Brooks Hall. Mr. Begley said that historically, most convention centers double in size in 5 years. As Moscone Center is constructed underground, there is no room for expansion of the facility. Therefore, he felt that the addition of a domed stadium in the South of Market would be a complimentary adjunct to existing convention facilities. It would not draw off any use of the existing facilities, but would enhance their use.

The same opinion was not shared regarding an upgraded and domed Candlestick Park. The location of Candlestick makes it undesirable for complimentary uses with existing convention facilities.

Few concerns regarding negative impacts were expressed. It was mentioned that access is a key element to any project of this sort, and that the cumulative parking impacts of a stadium and Moscone Center needed to be addressed.

SPUR

San Francisco Planning and Urban Research voiced their opinion on a proposed downtown stadium on November 23, 1982 in a letter to Mayor Dianne Feinstein. Following are excerpts:

> "San Francisco is blessed with many fine public amenities. A new downtown stadium could greatly add to these if it is economically feasible."
>
> "We urge first that a site closer to downtown be found."
>
> "The doming of Candlestick continues to be a viable alternative."

SPUR has formed a formal committee to research and investigate the stadium issues, and the City can expect comment and preferred alternatives from them after this study has been presented.

SPUR SURVEY, SEPTEMBER 1982

A September 1982 survey done by BBW Research for San Francisco Planning and Urban Research (SPUR) indicated that a new domed stadium was preferred by respondents who were conservative, male, over age 40, higher income blue collar workers, higher income persons outside the labor market, residents of Area 1 (Park Merced, Pacific Heights, Nob Hill, Golden Gateway) and Republicans. The sample as a whole preferred to improve and dome Candlestick Park.

Following are statistical tables for other questions in the survey which pertain to a proposed new stadium in the downtown area.

Table 6

Q. 25 - How would you feel if the Giants moved out of San Francisco?

	Total	What to do with Candlestick Park		
		Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
Extremely/ somewhat unhappy	245 100% 61%	101 41% 74%	98 40% 83%	20 8% 27%
Wouldn't care at all	123 100% 31%	32 26% 23%	17 14% 14%	46 37% 63%
Would prefer that they moved	11 100% 3%	2 18% 1%	1 9% 1%	4 36% 5%

- Voters who would be unhappy if the Giants left San Francisco are equally divided between the two construction options. Those who wouldn't care about the Giants leaving prefer to leave candlestick as it is.

Table 8

Q. 28 - Would you vote For or Against the sale of $50 million worth of bonds to finance either improving Candlestick or building a new stadium?

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
For	179 100% 45%	67 37% 49%	90 50% 76%	11 6% 15%
Against	144 100% 36%	55 38% 40%	11 8% 9%	59 41% 81%
Not Sure/ Don't Know/ NA	70 100% 18%	15 21% 11%	17 24% 14%	3 4% 4%

- Those in favor of the bond sale would prefer a new stadium. Those opposed to a bond sale are evenly divided between doing nothing and improving Candlestick Park's existing facilities.

Table 9

Q. 30 - If a new stadium is built would you vote for or against a measure to sell Candlestick Park?

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400	137	118	73
	100%	34%	30%	18%
	100%	100%	100%	100%
For	226	60	109	37
	100%	27%	48%	16%
	57%	44%	92%	51%
Against	98	57	4	24
	100%	58%	4%	24%
	25%	42%	3%	33%
Not Sure/	68	20	5	11
Don't Know/	100%	29%	7%	16%
	17%	15%	4%	15%

- Those who would vote to sell Candlestick Park would prefer a new stadium. Those who would not vote to sell Candlestick would prefer to improve existing facilities.

Table 10

Q. 31 - If the City provided land but did not use tax dollars to support a new stadium would you be more or less likely to support a new stadium downtown?

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
More Inclined	204 100% 51%	59 29% 43%	94 46% 80%	35 17% 48%
Less Inclined	112 100% 28%	61 54% 45%	15 13% 13%	24 21% 33%
Not Sure/ Don't Know/ Refused/NA	84 100% 21%	17 20% 12%	9 11% 8%	15 18% 21%

- Those who would be more inclined to support a new downtown stadium if City tax dollars weren't used, in fact, prefer the new stadium option. Those who would be less inclined favor the option of improving Candlestick Park.

Table 11

Q. 32 - If a stadium were built downtown it would be used more than Candlestick for non-sporting events.

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
Strongly/ Somewhat Agree	301 100% 75%	102 34% 74%	108 36% 92%	54 18% 74%
Strongly/ Somewhat Disagree	44 100% 11%	21 48% 15%	8 18% 7%	10 23% 14%

o Those who agree with this statement are evenly divided between the two construction options. Those who disagree approve of the improvement option.

Table 12

Q. 32 - It would be more difficult to drive and park downtown than to Candlestick?

	Total	What to do with Candlestick Park: Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400	137	118	73
	100%	34%	30%	18%
	100%	100%	100%	100%
Strongly/	234	105	49	50
Somewhat	100%	45%	21%	21%
Agree	59%	77%	42%	68%
Strongly/	91	22	55	6
Somewhat	100%	24%	60%	7%
Disagree	23%	16%	47%	8%

- Those who agree with this statement prefer improvement of existing facilities. Those who disagree want to build a new stadium.

Table 13

Q. 32 - A downtown stadium would attract restaurant and shops which would pay the City needed taxes.

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
Strongly/ Somewhat Agree	275 100% 69%	93 33% 67%	113 42% 96%	40 15% 35%
Strongly/ Somewhat Disagree	64 100% 16%	35 5% 26%	3 5% 3%	17 27% 23%

o Those who agree with this statement want to build a new stadium. Those who disagree favor Candlestick improvements.

Table 14

Q. 32 - There would be more and better public transportation to a downtown stadium.

	Total	What to do with Candlestick Park: Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
Strongly/ Somewhat Agree	281 100% 70%	90 32% 66%	112 40% 95%	44 16% 60%
Strongly/ Somewhat Disagree	61 100% 15%	37 61% 27%	1 2% 1%	15 25% 21%

- Those who agree with this statement want to sell Candlestick and build a new stadium. Those who disagree favor Candlestick improvements by an overwhelming margin.

Table 15

Q. 32 - It would be less enjoyable to watch sports in a domed stadium than an open air stadium.

		What to do with Candlestick Park		
	Total	Improve Candlestick Add Dome	Sell Candlestick Build New Stadium	Leave Candlestick As Is
Total	400 100% 100%	137 34% 100%	118 30% 100%	73 18% 100%
Strongly/ Somewhat Agree	133 100% 33%	42 32% 31%	40 30% 34%	32 24% 44%
Strongly/ Somewhat Disagree	175 100% 44%	77 44% 56%	62 35% 53%	18 10% 25%

- Those who agree with this statement are evenly divided on whether to improve Candlestick or build a new stadium. Those who disagree prefer the improvement option.

BOARD OF SUPERVISORS

During the alternate site selection process the members of the Board were invited to attend a site presentation and asked for comment on proposed downtown sites as well as disposition of Candlestick Park. Board Members who participated included Maher, Ward, Silver, Britt, Kennedy and Walker. Members declining were Nelder, Renne and Kopp. Molinari and Hongisto were unable to schedule time to participate.

Comments regarding specific downtown sites included:

- Agreement that sites 11 & 13 should not be considered
- Preference for sites 7, 8, 14
- The need to study one site in depth
- Site 8 could interfere with port plans
- Possibility of extracting a land grant from Southern Pacific

- o Possibility of making the decision to build new or renovate now, but delay a start until revenues are available.

Honorable George Christopher

George Christopher, Mayor of San Francisco from 1956-1964 issued a 41 page document in September of 1982. The basic thrust of the report is to raise questions regarding the feasibility of a stadium in the South of Market area and support for improvements to Candlestick Park. He is quoted in the SF Chronicle 12/22/82 in regards to site 7 in the China Basin:

> "... (George Christopher) argues that an industrial park, not a stadium would 'be great there. It would bring the highest yield, would bring payrolls to San Francisco.'"

San Francisco Giants

The March 1982 study, "The Future of Candlestick Park" prepared by the San Francisco Giants mentions positive impacts resulting from a new stadium in the South of Market.

> "The Revitalization of South of Market which has begun slowly with the opening of the Moscone Center, could be further stimulated by the construction of a year-round sports-entertainment facility. The construction of a new stadium in the area could serve as a catalyst for major development. Despite the fact that plans are already in the works for major development of that area, there can be little doubt that the construction of a new stadium in that location would serve as a magnet to draw people into a part of San Francisco to which they are not now accustomed to coming. That drawing effect can only serve to hasten the development of that area, thus providing more property tax revenues for the general fund faster.

> "The Development of Small Business would also be stimulated in the area surrounding the new facility to provide for the needs of the millions of person who would visit the new stadium. For a variety of reasons, those service-type of institutions, namely restaurants, bars, clubs, hotels, etc., which tend to spring up around facilities of this type have failed to do so in over twenty years at Candlestick Park. It is an undeniable fact that people who come to Candlestick Park, a great many of whom come from outside of San Francisco, do not patronize establishments around the stadium, as is the practice in other locales.

"Enhanced Public Transit opportunities exist for a South of Market site because of the availability of all regular surface transit as well as BART and Southern Pacific. In addition, shuttle service to the financial district would make it possible for downtown workers to leave their car at work, attend an event at the stadium (while stopping off for a bite at their favorite bistro), and then take a shuttle back to their car after the event.

"Utilization by Tourists would be a reality at a downtown facility, whereas Candlestick Park is rarely on the agenda of a visitor to San Francisco. A sports-entertainment facility located near the Moscone Center and convenient to downtown hotels which offered a variety of events throughout the year could only serve as another major reason to come to San Francisco for potential visitors."

Other Public Input

During the course of the study we collected letters received by the Mayor, S.F. Planning Department, the Giants, S.F. Supervisors and the study team, proposing a variety of ideas for stadium design, financing and site selection. These ideas included the following for a downtown stadium alternative.

- o Building a smaller 18,000-19,000 seat sports arena to accommodate basketball, boxing, tennis, etc. at a downtown location.
- o Designing a stadium using a replica of the Golden Gate Bridge as a super structure.
- o Building a new stadium on the site of Kezar and Poly High School.
- o A smaller basketball only stadium at Kezar and a parking garage at Poly High School with open air parking on the roof for tailgating.
- o A site bounded by 3rd, 4th, Mission and Howard.
- o A site bounded by 1st, 2nd, Folsom and James Lick freeway ... building the stadium on the air rights over the free ways.
- o Building a stadium over the water in the Bay.
- o A high-rise stadium as centerpiece of the Olympia York Yerba Buena Development.
- o A site further down the peninsula (San Jose, Palo Alto).

- Building an asymetrical and rectangular stadium.
- Sell poritons of Lincoln Golf Course to help finance a new stadium.
- Selling specific seats (50, 40, 30 yard line) as well as luxury boxes.
- Establishing a tax deductible Downtown Stadium Donation Fund to help finance a new stadium.

C. ALTERNATIVES

Not applicable.

D. ANALYSIS

There are shared perceptions and concerns regarding the construction of a stadium South of Market among all the publics represented in the study. Following is a summary of the major areas of concern.

Traffic/Transit/Parking

Traffic/transit and parking concerns were expressed by all of the community groups, other developers and the convention facilities representative. In addition, 59% of the respondents in the SPUR survey thought that it would be more difficult to drive and park downtown than to Candlestick Park. Concerns include:

- the creation of adequate parking for a stadium without adversely affecting existing and proposed residential and business development;
- the cumulative impact of all existing and proposed South of Market development on traffic and transit;
- the eventual touchdown of the I-280 freeway;
- emergency vehicle access;
- Embarcadero freeway traffic.

Evironmental/Social

Concerns regarding environmental and social impacts were most often mentioned by neighborhood and community groups. These concerns are:

- o increased air pollutants created by more traffic;
- o increased noise pollution caused by traffic and stadium noise;
- o the possible destruction of view corridors and the visibility of stadium lights from surrounding neighborhoods;
- o the impact on the senior population;
- o the potential increase in crime;
- o the influx into residential neighborhoods of rowdy fans and concert attendees;
- o the impact on wildlife in the Mission Creek area.

Financial

There was an element of concern expressed by all community groups regarding how the stadium would be financed. Common concerns were:

- o who pays for it and how much will it cost;
- o how will it be financed;
- o will a tax assessment be necessary;
- o should the City consider spending money on a sports and entertainment facility or address other problems such as housing and unemployment.

Mission Bay

As a majority of the stadium study sites are on land owned by Southern Pacific, and a part of their proposed Mission Bay development, there was concern expressed on the part of the neighborhood and community groups regarding the relationship between a stadium and the Mission Bay project.

- o could the acquisition of land from Southern Pacific involve a trade-off in Mission Bay design development such as building height limitations;

- would a stadium depend upon the eventual existence of the proposed Mission Bay development.

Go-No Go Decision

The proximity and impact of a stadium South of Market on other developments brought up a concern by developers to have a decision made by the Board of Supervisors regarding the downtown-stadium option within a short period of time. They feel that any postponement of a decision could radically affect their proposed and in some cases approved development plans. This concern is also share by the Giants, who, considering the expiration of their franchise with the City need to plan for the future.

These concerns illustrate the potential a new stadium South of Market has to draw opposition from many different public segments.

It is clear that the residential, neighborhood and community organizations are extremely concerned about the impact of not just a proposed stadium but any new development in the South of Market. A common concern shared by both community groups and adjacent developers is the question of cumulative impacts. With so much proposed development planned for the South of Market, it is difficult for concerned groups and individuals to consider the projects on an individual basis.

Community groups and organizations are concerned with the social impacts a stadium would have on the neighborhood and its residents. How is an increase in automobile and pedestrian traffic going to change the lives and livelihood of existing residents and businesses. There is also a concern that the time attention and money being spent to investigate the feasibility of stadium alternatives should be spent addressing other important issues such as housing and unemployment.

A decision to continue to pursue any downtown stadium alternative by the City can expect to draw strong opposition from community groups.

Depending upon the site selected, the downtown stadium alternative could garner varying degrees of support or opposition from other South of Market developments.

There is no element of strong support among the developers. Showplace Square, Mission Bay and China Basin developers give one the impression that if the City's decision is that the best alternative is to build a new stadium downtown then they could probably "live with it" and perhaps benefit from its presence. However, Showplace Square would lean toward opposition if sites

5 or 6 were chosen. The South Beach Developers are at the present time opposed to a stadium on sites 7 and 14 and could better tolerate it on sites 5 or 6.

China Basin and South Beach Developers also share the major concern that development of their proposed projects hinge upon a "go"-"no-go decision by the City on the the downtown stadium alternative.

Due to the controversy that has been created by past projects such as Candlestick Park and Moscone Center, it can be expected that the media will continue to scrutinize, question and compile their own research around whatever alternative is chosen. The attention paid to the stadium issue in the past will continue.

The 1982 SPUR survey indicates that there is support for a new stadium. Those voters who prefer the new stadium option would be unhappy to see the Giants leave San Francisco; would vote for the sale of $50 million worth of bonds to finance a new stadium; would vote to sell Candlestick Park; would be more inclined to support a new downtown stadium if City Tax Dollars were not used; agree that a downtown stadium would attract restaurants and shops, and agree that there would be more and better public transportation to a downtown stadium.

Although the sample as a whole prefers the Candlestick Park improvement option, they would also vote for a measure to sell Candlestick Park if a new stadium were to be built, and would vote for the sale of $50 million worth of bonds to finance either Candlestick improvements or construction of a new stadium.